
**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Fostering Innovation and Investment in the)	GN Docket No. 09-157
Wireless Communications Market)	
)	
A National Broadband Plan For Our Future)	GN Docket No. 09-51

COMMENTS OF CTIA-THE WIRELESS ASSOCIATION[®]

Michael F. Altschul
Senior Vice President, General Counsel

Christopher Guttman-McCabe
Vice President, Regulatory Affairs

Robert F. Roche, Ph.D.
Vice President, Research

Brian M. Josef
Director, Regulatory Affairs

CTIA-THE WIRELESS ASSOCIATION[®]
1400 16th Street, NW, Suite 600
Washington, DC 200036
(202) 785-0081

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SUMMARY

The wireless market is best characterized by a virtuous cycle of innovation and investment. While the points along the virtuous cycle are potentially limitless, CTIA has identified five core elements: (1) Service Providers; (2) Infrastructure Vendors (Networks); (3) Device Manufacturers; (4) Operating Systems Developers; and (5) Applications Developers. Innovation and investment occur independently within these five elements, but, at the same time, developments in each element spur innovation and investment in others. So as innovation and investment occur, the mobile ecosystem becomes increasingly diverse and robust.

Of course, the lifeblood of the mobile wireless industry is spectrum, and in order for the virtuous cycle to continue to turn, the FCC must identify additional spectrum to ensure that the U.S. mobile wireless market remains the world's leader. In this regard, CTIA recently called for U.S. policymakers to launch an effort to identify and allocate at least 800 MHz of additional spectrum for licensed commercial wireless use within the next six years. Such an allocation would be an important step towards meeting rapidly accelerating demand and maintaining U.S. leadership in the global mobile broadband innovation.

The virtuous cycle in the wireless market is evidenced by an unbridled focus on new services, enhancing network capabilities, bringing new products to market, and meeting consumer expectations. For example, network reliability, coverage, and capacity are critical to a carrier's ability to compete and attract customers in today's marketplace. This competitive pressure drives wireless companies to invest billions of dollars each year to expand their service coverage, improve the quality of their service and capacity of their networks, and enable innovative services to consumers across the country. Over the past twenty years, wireless carriers have made enormous investments in their networks, committing more than \$264 billion in cumulative capital expenditures – a combined average carrier investment of more than \$22.8 billion per year to expand and upgrade networks from 2001 to 2008.

However, Commission consideration of possible wireless network management obligations threatens to undermine the virtuous cycle. As the upcoming proceeding unfolds, it is critical that the Commission recognize that wireless broadband networks are fundamentally different than other broadband networks for many reasons. The Commission should not attempt to shoehorn the modern, innovative wireless broadband industry into a definition crafted and applied for use on wireline technologies. The Commission also should be mindful of how network neutrality rules would be applied to business relationships in the wireless ecosystem, which often are evolving and more dynamic than those typically found in other sectors. Finally, the Commission must recognize the incredible pace of change and innovation in this ecosystem. In the last 18 months, the ecosystem has seen the evolution of networks to 3G and now 4G technologies, the explosion of innovative handsets, the birth of application stores, and the excited adoption by consumers of all of these changes.

The Virtuous Cycle. Each segment of the virtuous cycle has experienced remarkable innovation and investment, and developments in each segment continue to spur innovation and investment in others. For example:

- ***Service Providers.*** 270 million American wireless customers have more choices than consumers in nearly every developed country in the world because of the deployment

efforts of U.S. wireless carriers. Moreover, the combination of highly efficient networks and advanced wireless devices has made U.S. carriers the most efficient users of spectrum worldwide. Today, U.S. wireless service providers operate some of the most extensive and actively-used 3G wireless data networks in the world, and U.S. data usage is growing exponentially. U.S. carriers are leading the world in the development and deployment of next generation technologies, including 4G networks.

- ***Infrastructure Vendors (Networks).*** The transformation of the network over the past 30 years from voice-centric to multi-media confirms the significant levels of innovation and investment that have occurred in the network. U.S. consumers will increasingly experience tremendously fast 4G network downlink speeds with the widespread deployment of LTE and WiMAX.
- ***Device Manufacturers.*** As state-of-the-art mobile devices have processing power more like that of a computer, the U.S. is becoming the hotbed for smartphone deployment, particularly as service providers move to implement openness initiatives.
- ***Operating Systems Developers.*** At least nine increasingly powerful mobile operating systems are battling to manage today's sophisticated wireless platform.
- ***Applications Developers.*** This segment of the wireless mobile ecosystem essentially did not exist 18 months ago, and now the market boasts over 100,000 applications and growing.

As the Commission looks at metrics to develop a possible framework for evaluation of innovation and investment, CTIA offers the following observation: the virtuous cycle can be quantified by charting the evolution of the mobile wireless ecosystem, through data points such as increased wireless use, deployment of advanced handsets, application growth, and efficient use of spectrum.

Beyond Broadband to All Corners of the Mobile Ecosystem. The benefits of today's wireless network deployment extend far beyond consumer or enterprise mobile broadband use. With the evolution from cell phones to smartphones and wireless data devices, enhanced network functionality, devices, and applications are improving healthcare, the environment, education, manufacturing efficiency, and workforce productivity. To emphasize the level of innovation and investment across the mobile ecosystem, these comments highlight specific developments in a number of sectors including:

- Health care management ("mHealth");
- Smart grids;
- Mobile learning ("mLearning");
- Other machine to machine ("M2M") innovations in the areas of personal security, smart logistics, and smart manufacturing; and
- Innovative "green" wireless technologies.

Non-Technical Innovation. Similarly, innovation in the mobile ecosystem also occurs in non-technical ways, like in wireless service and pricing plans. As service providers compete vigorously in a number of non-traditional elements of the mobile wireless ecosystem, there has been remarkable innovation in the carrier / customer relationship from the point of sale and throughout the life of a customer relationship. For example, carriers offer consumers extended trial periods, detailed coverage maps, prorated early termination fees, prepaid plans and more.

The Exclusive-Use, Flexible Rights Licensing Framework. With regard to spectrum licensing, the history of the commercial mobile radio services (“CMRS”) market demonstrates that granting an entity the right to an exclusive, flexible use of a block of spectrum, and ensuring that entity’s use of the spectrum will not be subject to harmful interference, is a tremendously powerful way for the government to encourage innovation and investment. The exclusive-use, flexible rights license model has worked to create large-scale mobile networks requiring extensive investment in infrastructure, such as today’s commercial mobile wireless networks. This model has stimulated a virtuous cycle in the mobile wireless ecosystem, resulting in tremendous investment and innovation that continues to this day.

Spectrum is rapidly being consumed by the increasingly bandwidth-intensive content being sought by users. The demand is exponential, and policymakers must launch a major effort to identify and allocate sufficient additional spectrum – at least 800 MHz – for commercial mobile broadband use and work to meet short-term needs by pairing and allocating readily-available spectrum in the 1755-1780 MHz and 2155-2180 MHz bands for licensed use as quickly as possible.

Further, the FCC must explore ways to identify additional spectrum for CMRS licensees. Conducting a Federal government spectrum inventory could be an important part of this effort and would help carry out the purposes of Commercial Spectrum Enhancement Act (“CSEA”).

Actions to Further Innovation and Investment. Finally, CTIA makes a number of specific regulatory recommendations for the Commission to consider, including:

- Facilitating the timely deployment of wireless infrastructure by adopting CTIA’s petition on tower siting.
- Improving the process for identifying spectrum for future reallocation and, particularly the need for greater information, transparency and coordination between Federal and commercial entities in future relocations under the CSEA.
- Seeking input from the Technical Advisory Committee on technical issues.
- Taking steps to streamline equipment and special temporary authorizations.
- Exercising care to ensure that the Commission does not hamper efforts by the wireless industry to develop industry-wide standards for challenging issues.

We are living in a period of intense innovation and investment in the mobile wireless communications marketplace. American consumers and businesses are reaping daily the innovation that results from a robust and competitive mobile ecosystem, and the FCC should take the necessary steps to ensure that the virtuous cycle of innovation and investment continues to advance.

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To: The Commission

COMMENTS OF CTIA-THE WIRELESS ASSOCIATION[®]

INTRODUCTION

As the Commission looks to further its understanding of “where and how key innovations are happening across the full ‘value chain’ of the wireless market,”¹ CTIA-The Wireless Association[®] (“CTIA”) urges the Commission to embrace the virtuous cycle of innovation and investment that is the hallmark of the mobile wireless industry. The staggering growth in wireless services over the past three decades, as the *Innovation NOI* recognizes,² would not be possible without this cycle of wireless technological development and capital investment, all occurring within a robustly competitive market. Notably, innovation and investment are not confined to one segment of the mobile wireless ecosystem. These developments occur in each link of the wireless “value chain.” But instead of thinking of a linear wireless value chain, the wireless market is best characterized by a virtuous cycle of innovation and investment.

¹ *Fostering Innovation and Investment in the Wireless Communications Market; A National Broadband Plan For Our Future*, Notice of Inquiry, GN Dockets 09-157 and 09-51, FCC 09-66 (rel. Aug. 27, 2009) (“*Innovation NOI*”) at ¶ 4.

² *Id.* at ¶ 3.

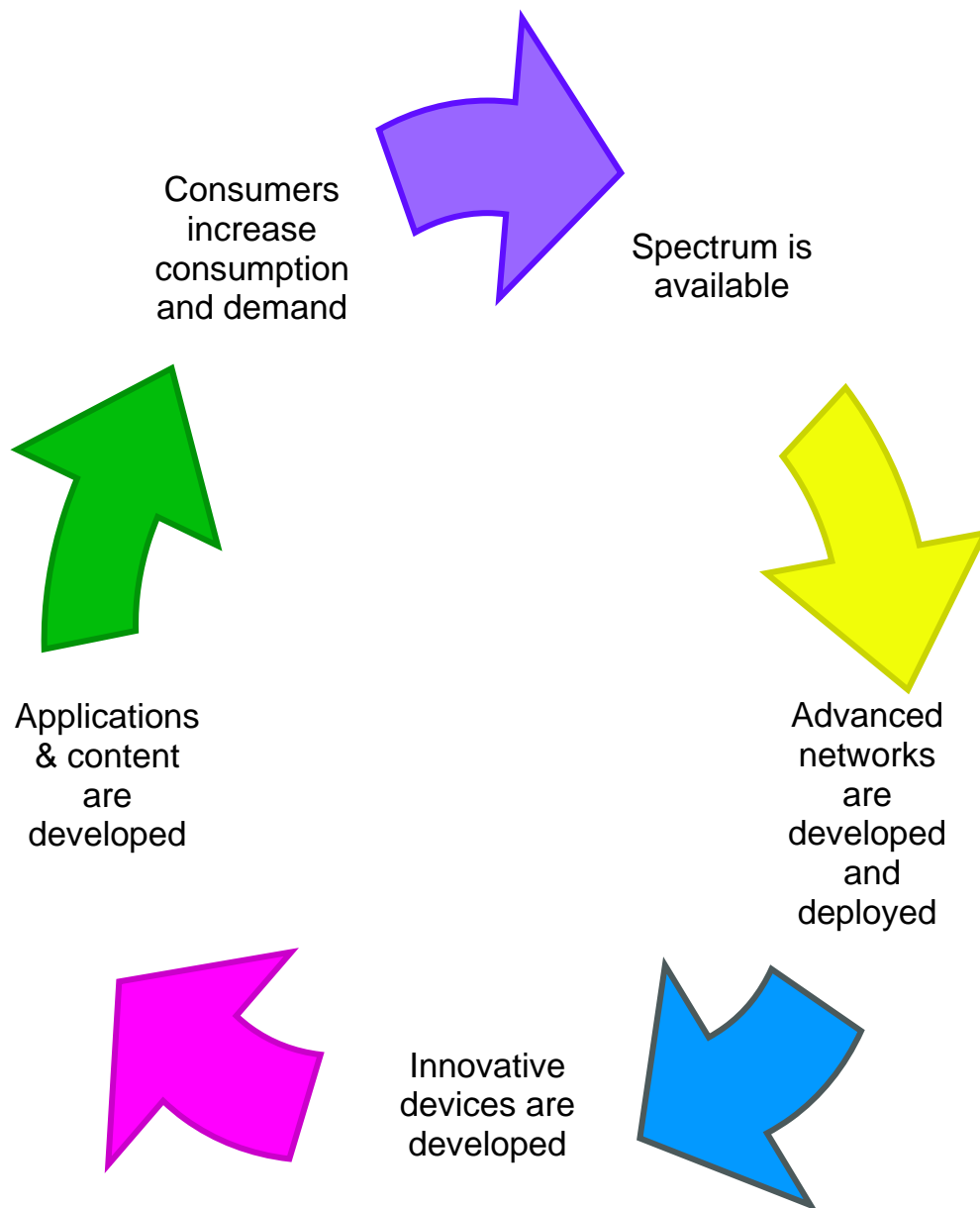


Figure 1. The Virtuous Cycle of the Mobile Wireless Ecosystem

This loop characterizes the ongoing interactions between all aspects of the industry as innovation and investment occur at any time along the circle depending on developments elsewhere on the circle. The Commission could consider the ecosystem as experiencing a modified Newton's Third Law of Motion – in this case the Third Law of Wireless Innovation – for every innovation or

investment in the cycle, there is the probability of another innovation or investment occurring elsewhere in the cycle.

While the points along the virtuous cycle are potentially limitless, CTIA has identified five core elements: (1) Service Providers; (2) Infrastructure Vendors (Networks); (3) Device Manufacturers; (4) Operating Systems Developers; and (5) Applications Developers. As discussed in more detail below, innovation and investment occur independently within these five elements, but, at the same time, developments in each element spur innovation and investment in others. So as innovation and investment occur, the ecosystem becomes increasingly diverse and robust.

Also, the FCC's exclusive-use, flexible licensing regime has enabled commercial mobile radio service ("CMRS") licensees to invest in network deployment and expansion, and to maximize their spectrum use. This approach breeds innovation and investment in the U.S. and has resulted in the world's most competitive wireless marketplace.

However, Commission consideration of wireless network management obligations threatens to undermine this virtuous cycle. The innovations that abound in the mobile ecosystem – including the new devices and applications that U.S. consumers increasingly enjoy – depend on the ability of carriers to freely invest in, modify, and manage their networks. For example, improved voice quality and increased high speed data throughput depend on infrastructure advances like new vocoders. Visual voice mail applications offered by carriers including AT&T, Sprint Nextel and Verizon Wireless are enabled by the investment in network equipment capable of handling this new service. Looking ahead, an independent vendor may come up with an innovative storage technology or transmission algorithm to limit the impact of network congestion. Will such a technology be permissible under new rules? If so, must the details be fully disclosed? What will be the impact of government regulation on innovation? An overreaching network management policy

may jeopardize the very relationships that can help keep this virtuous cycle moving in the right direction.

Ultimately, uncertainty over possible government action slows innovation as companies become reluctant to invest in new technologies because next generation network features (and the services they support) could be impacted by network management decision.³ Wireless network management obligations, for example, could undermine the innovation and investment in technologies that will support national security services and applications. Wireless Priority Services remain a critical component of prioritizing communications among national security and emergency preparedness personnel during times of emergency circumstances and network congestion.⁴ Similarly, service providers and infrastructure vendors continue to work on technologies that could prioritize the delivery of Voice over Internet Protocol (“VoIP”) calls to public safety answering points (“PSAPs”)⁵ and advance the evolution of the Commercial Mobile Alert Service.⁶ The Commission must consider the threats to the vitality of the mobile ecosystem before adopting or restricting any network management regime.

Finally, the lifeblood of the mobile wireless industry is spectrum, and in order for the virtuous cycle to continue to turn on the axes of innovation and investment, the Commission must identify additional spectrum for licensed mobile broadband to ensure that the U.S. mobile wireless market remains the world’s leader. CTIA has called on the Commission to identify and reallocate

³ See WASHINGTON POST, *The FCC’s Heavy Hand*, Sept. 28, 2009, available at <http://www.washingtonpost.com/wp-dyn/content/article/2009/09/27/AR2009092703026.html> (last visited Sept. 29, 2009). (Network management regulations would “stifle further investments by ISPs – with attempts to micromanage what has been a vibrant and well-functioning marketplace.”).

⁴ See generally U.S. Government Accountability Office, *EMERGENCY COMMUNICATIONS, National Communications System Provides Programs for Priority Calling, but Planning for New Initiatives and Performance Measurement Could Be Strengthened*, GAO-09-822 (Aug. 2009).

⁵ See Donny Jackson, *NORTEL PROPOSES VoIP 911 SOLUTION* (Apr. 19, 2009), available at http://telephonyonline.com/regulatory/print/telecom_future_seen_technology_46/ (last visited Sept. 29, 2009).

⁶ See FCC Public Safety and Homeland Security Bureau, *Commercial Mobile Alert System*, available at <http://www.fcc.gov/pshs/services/cmas.html> (last visited Sept. 29, 2009).

significant amount of spectrum – with a goal of at least 800 MHz – for licensed commercial wireless services.⁷ While it is impossible to quantify precisely what amount of additional spectrum will be required to meet the existing pace of adoption and innovation, such an allocation would be an important step towards meeting rapidly accelerating demand and maintaining U.S. leadership in the global mobile broadband marketplace.

DISCUSSION

I. THE MOBILE WIRELESS ECOSYSTEM IS COMPOSED OF AT LEAST FIVE DISTINCT ELEMENTS, EACH CONTRIBUTING TO A VIRTUOUS CYCLE OF INVESTMENT AND INNOVATION

A. The Virtuous Cycle Benefits The Entire U.S. Economy Through The Development Of New Services, Capabilities, Products, And Applications

The success of the mobile wireless industry is a testament to the innovation and investment that occurs in the sector on a daily basis. The ongoing attention to developing new services, enhancing network capabilities, bringing new products to market, and meeting consumer expectations are key components of the mobile ecosystem's virtuous cycle. As touched on below, notwithstanding the current economic conditions, the wireless industry continues to invest in mobile networks and create jobs, which will in turn spur innovation and ultimately lead to increased productivity and renewed economic prosperity.

⁷ See generally Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA, to Julius Genachowski, Chairman, Federal Communications Commission, *et al*, GN Docket No. 09-51 (filed Sept. 29, 2009) (“CTIA Spectrum Demand Ex Parte”).

1. Innovation And Investment Are Driving Wireless Consumer Demand And Use

Consumers have responded to the innovation in the mobile wireless ecosystem. In 1997, there were approximately 55 million wireless telephone subscribers.⁸ By year-end 2008, that number had risen almost five-fold, to more than 270 million.⁹

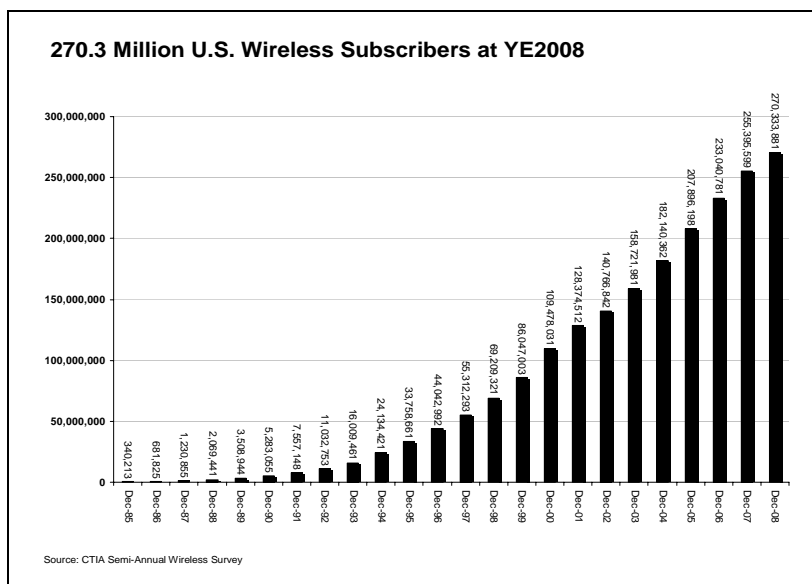


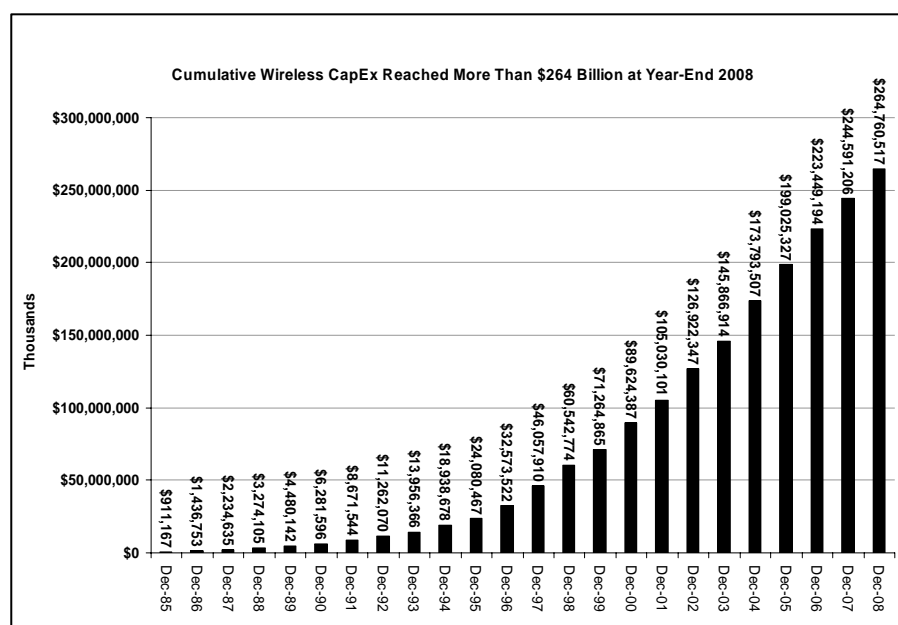
Figure 2. 270.3 Million U.S. Wireless Subscribers at YE2008

For service providers, the fact remains that network reliability, coverage, and capacity are critical to a carrier's ability to compete and attract customers. This competitive pressure drives wireless companies to invest billions of dollars each year to expand their service territories, improve the quality of their service, increase the capacity of their networks, and bring innovative services to consumers across the country. Over the past twenty years, wireless carriers have made enormous

⁸ See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Third Report, 13 FCC Rcd 19746 app. B, at B-2 (1998).

⁹ See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Twelfth Report, 23 FCC Rcd 2241, 2246, (2008) ("Twelfth CMRS Competition Report"). By year-end 2008, CTIA's Semi-Annual Survey had found wireless subscribership had risen to 270,333,881. See CTIA-The Wireless Association®, *Wireless Quick Facts*, available at http://www.ctia.org/media/industry_info/index.cfm/AID/10323 (last visited Sept. 29, 2009).

investments in their networks, committing more than \$264 billion in cumulative capital expenditures.¹⁰



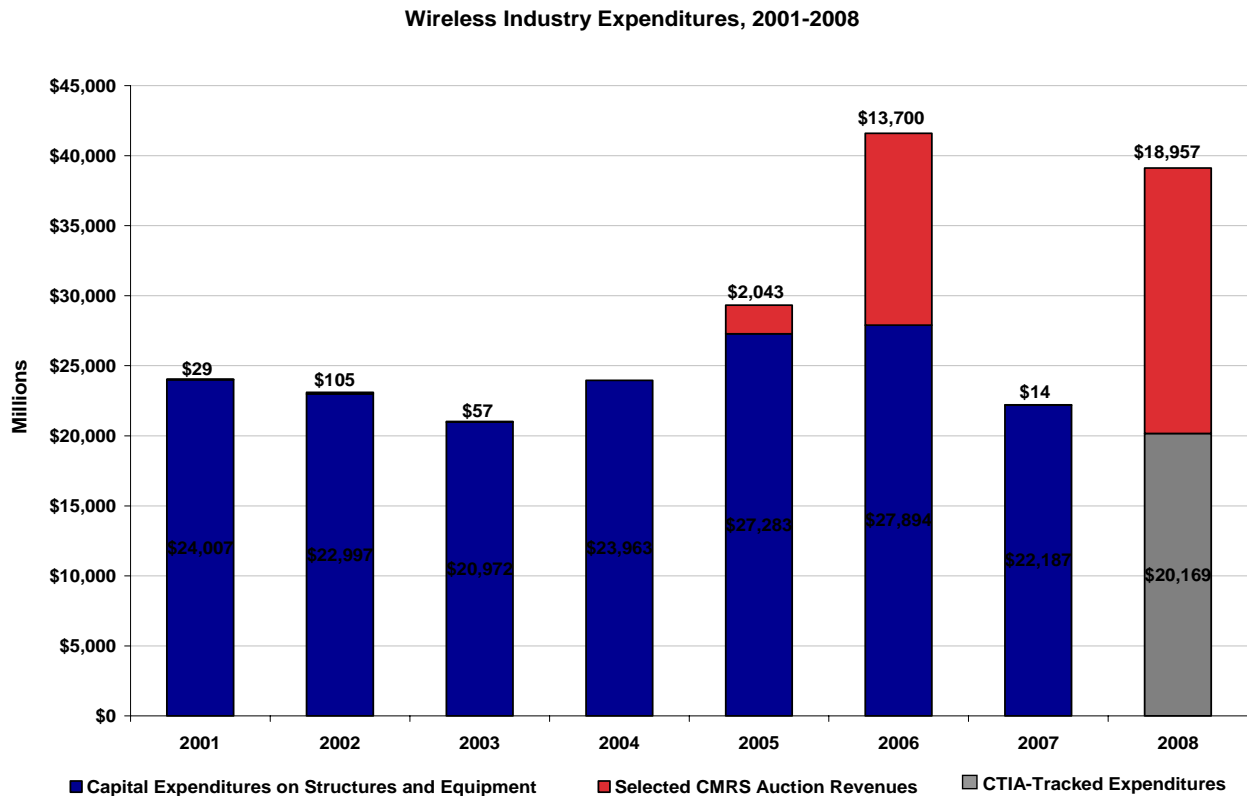
Source: CTIA Semi-Annual Survey

Table 3. Cumulative Wireless CapEx Reached More than \$264 Billion at YE2008

Even today, despite the most difficult economic times in recent memory, the wireless industry continues to commit substantial resources to meet evolving consumer demands, with total reported wireless carrier investment of more than \$20 billion for 2008. Indeed, wireless carriers have on average had a combined investment of more than \$22.8 billion per year to upgrade their networks from 2001 through 2008.¹¹ And actual investment is even higher when one includes the billions of dollars spent in auctions to acquire much-needed CMRS spectrum, as shown in Table 4. Perhaps most shocking, when spectrum costs are factored in to spending calculations, 2008 was the second highest year of expenditures.

¹⁰ This figure does not include the approximately \$33 billion paid by wireless carriers to the U.S. Treasury to acquire spectrum in the last two FCC auctions for CMRS spectrum. See generally <http://wireless.fcc.gov/auctions/> (last visited Sept. 22, 2009).

¹¹ See CTIA® *Semi-Annual Wireless Industry Survey*, available at <http://www.ctia.org/advocacy/research/index.cfm/AID/10316> (last visited Sept. 23, 2009) (“CTIA Semi-Annual Survey”).



Source: U.S. Census, FCC and CTIA data.

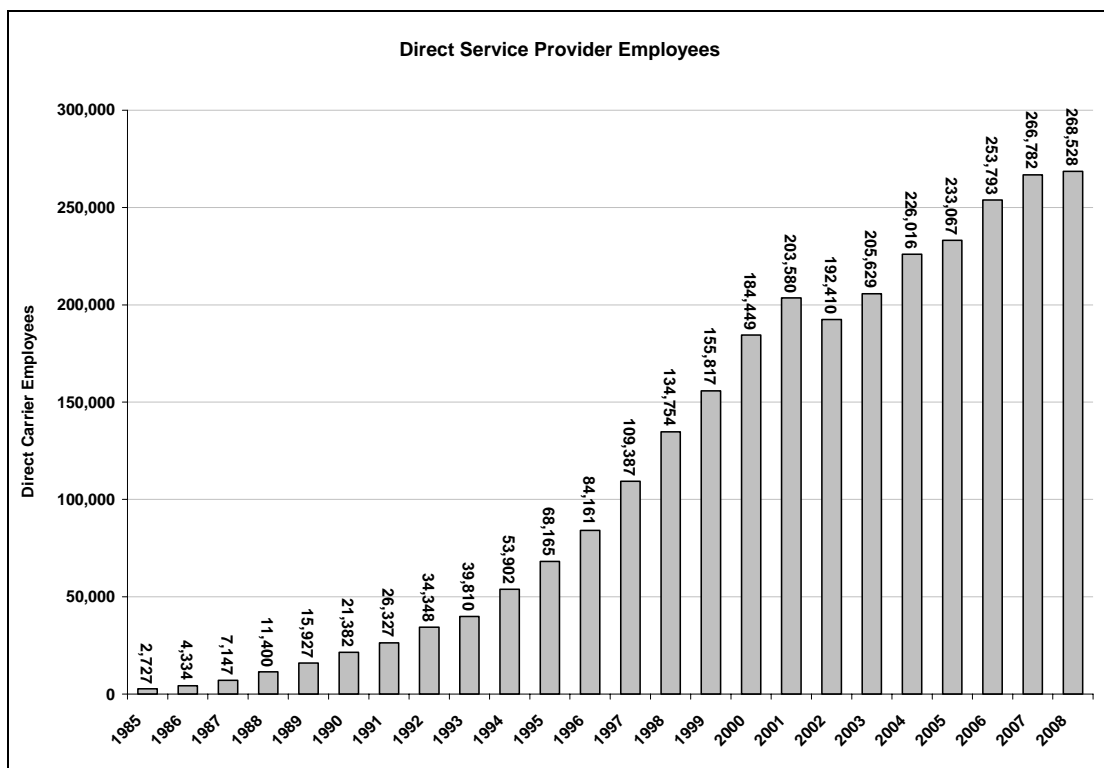
Table 4. Wireless Industry Expenditures, 2001-2008

Among the many benefits of the explosion of wireless innovation and consumer adoption is an ever-increasing array of high-paying, skilled jobs. The wireless industry has become a powerful and consistent creator of desirable jobs. As Dr. Harold Furchtgott-Roth explains, “[e]mployment and employment compensation are two of the primary measures of economic activity in an industry.”¹² By both measures, the wireless industry is continuing to grow and bring economic benefits to U.S. workers. A quick snapshot of the job creation occurring in the wireless industry demonstrates that:

¹² See Harold Furchtgott-Roth, *The Wireless Services Sector: A Key to Economic Growth in America* (Jan. 2009), at 4.

- **Wireless carriers directly employ more than 268 thousand people.**¹³
- **The number of jobs with wireless carriers has grown more than 6% year-over-year for the last four years.**
- **Looking beyond direct carrier employment, an enormous number of American jobs – more than 2.4 million – are either directly or indirectly dependent on the U.S. wireless industry.**

The following chart details the number of workers directly employed by wireless carriers from 1985 to 2008:



Source: CTIA Semi-Annual Survey
Table 5. Direct Service Provider Employees, 1985-2008

In addition, one should not ignore the important overall economic contributions occurring as a result of the investment and innovation in the wireless sector. Specifically, the economic contributions of wireless services have grown significantly faster than the rest of the U.S. economy, averaging over 16% growth vs. less than 3% for the remainder of the economy. In 2007, U.S.

¹³ CTIA Semi-Annual Survey.

wireless services delivered nearly \$100 billion in “value added” contributions to the U.S. Gross Domestic Product (“GDP”).

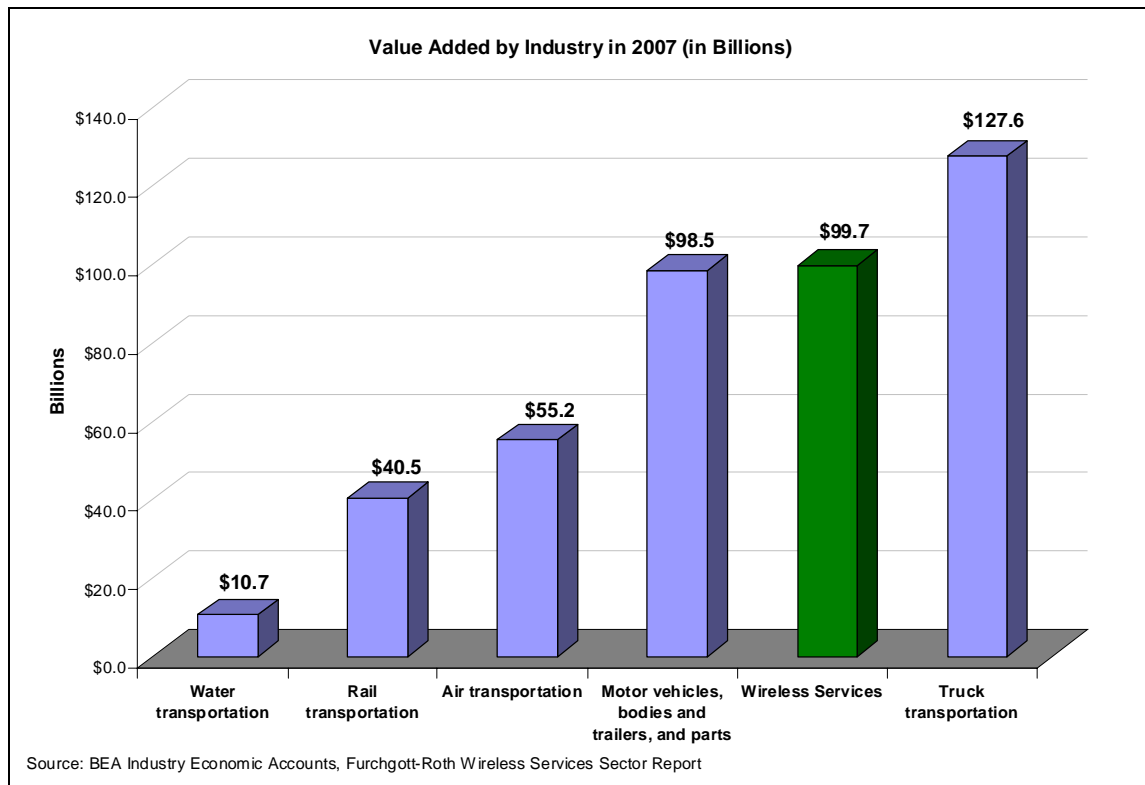
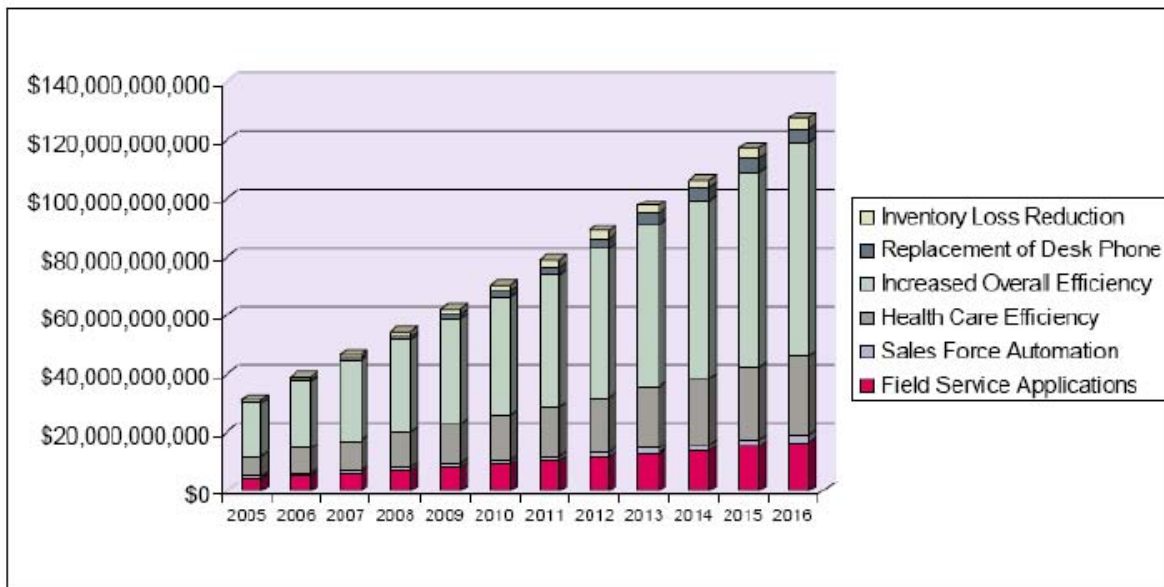


Table 6. Value Added by Industry in 2007

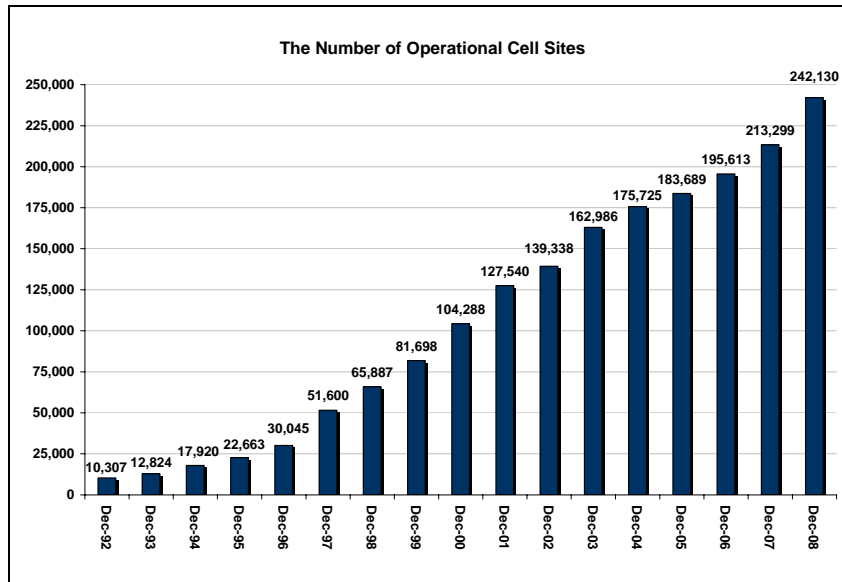
And going forward, estimates place productivity gains from wireless broadband services at almost \$860 billion between 2005 and 2016.



Source: 2008 Ovum Wireless Report

Table 7. Wireless Broadband Services Productivity Gains, 2005-2016

Another indicator of the investment wireless carriers have made to reach consumers is the hundreds of thousands of cell sites service providers and infrastructure suppliers have deployed across the country. Table 8 highlights the ongoing deployment of cell sites and the fact that, as of December 2008, wireless carriers have deployed over 240,000 in the U.S.



Source: CTIA Semi-Annual Survey
Table 8. The Number of Operational Cell Sites

Because of this significant investment by service providers, wireless connectivity is virtually ubiquitous and growing daily in terms of speed, capacity, capability, coverage, and usefulness. U.S. consumers have embraced the convenience of mobility, as they far and away enjoy the most minutes of use (“MOUs”) of any country, averaging 829 minutes per month, or more than 2.2 trillion minutes in 2008.

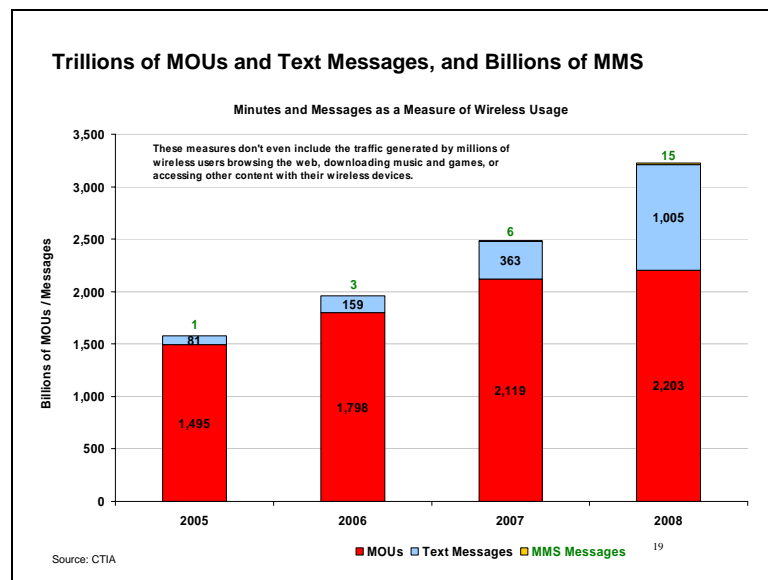


Table 9. Trillions of MOUs and Text Messages, and Billions of MMS

Most significantly, consumer demand and network investment show no signs of decreasing. As mentioned above, 2008 was one of the highest years for expenditures, and also as discussed above and below, the pace of innovation over the last 18 months is nothing short of staggering. In fact, the pace of deployment actually may increase as demand for connectivity continues to increase and carriers undertake significant network investments to deploy in the AWS and 700 MHz spectrum and upgrade their networks to 4G technologies.

2. With Continued Innovation And Investment, Wireless Networks Expand Capability And Functionality

The wireless industry is playing a vital role in our nation's economy by advancing our communications infrastructure, increasing productivity, and creating jobs. Today, virtually every business in the U.S. relies on networked communications services, and increasingly these businesses rely on mobile communications. The success of the mobile wireless industry – as a direct contributor to the U.S. economy and as an indirect input into businesses of all sizes – represents one of the crowning accomplishments of U.S. communications policy.¹⁴

A growing body of literature demonstrates that the wireless industry is having a massive impact on productivity across the U.S. economy.¹⁵ In a 2008 report, economic analyst firm Ovum estimated that wireless voice services played a central role in improving U.S. productivity, citing four major examples: 1) faster and more efficient decision-making; 2) reduction of unproductive travel time; 3) significant improvements in logistics; and 4) empowering small business.¹⁶ This increased productivity goes hand in hand with the ongoing innovation in the mobile wireless ecosystem. As the wireless network expands, it has profound effects for the entire U.S. economy.

¹⁴ See generally Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA, to Julius Genachowski, Chairman, Federal Communications Commission *et al*, GN Docket No. 09-51 *et al*. (filed July 9, 2009).

¹⁵ See Roger Entner, Ovum, *The Increasingly Important Impact of Wireless Broadband Technology and Services on the U.S. Economy* (2008) (“2008 Ovum Wireless Report”); Soren Buttekereit, Luis Enriquez, Ferry Griijpink, Suraj Maraje, Wim Torfs, Tanja Vaheri-Delmulle, McKinsey & Company, *Mobile Broadband For the Masses* (Feb. 2009).

¹⁶ 2008 Ovum Wireless Report at 6.

Of course, research and development (“R&D”) is central to any discussion of the innovation and investment in the U.S. wireless industry. Driven largely by intense competition in all sectors of the industry, upgrades in technology continue to be introduced at a staggering pace – and R&D plays a pivotal role in their development. From analog to digital, from second generation (“2G”) to 2.5G, to 3G and now to 4G, technology advancements have progressed so rapidly that some operators have skipped phases knowing that the next upgrade was just around the corner. And, developments like these have occurred throughout the virtuous cycle. Handset advancements have seen a remarkable evolution, with touch screens, full Internet access, and camera capabilities today that could not have been envisioned even a few years ago. From the growing number of operating systems and mobile applications introduced in the past two years alone, none of these advancements could have been achieved without the necessary R&D from all industry segments.

The level of innovation in the wireless ecosystem can be tracked by the level of patent activity. According to the U.S. Patent Office, more than 40,000 wireless-related patents have been granted in the U.S. in the last 18 years, not including additional Wi-Fi related patents. More than 39,000 wireless-related patent applications have been filed in the U.S. just in the last seven years. Perhaps most illustrative, for the past four years the number of patents has increased each year, from 4,040 in 2005 to 6,505 in 2008. The level of patent activity is shown visually below.

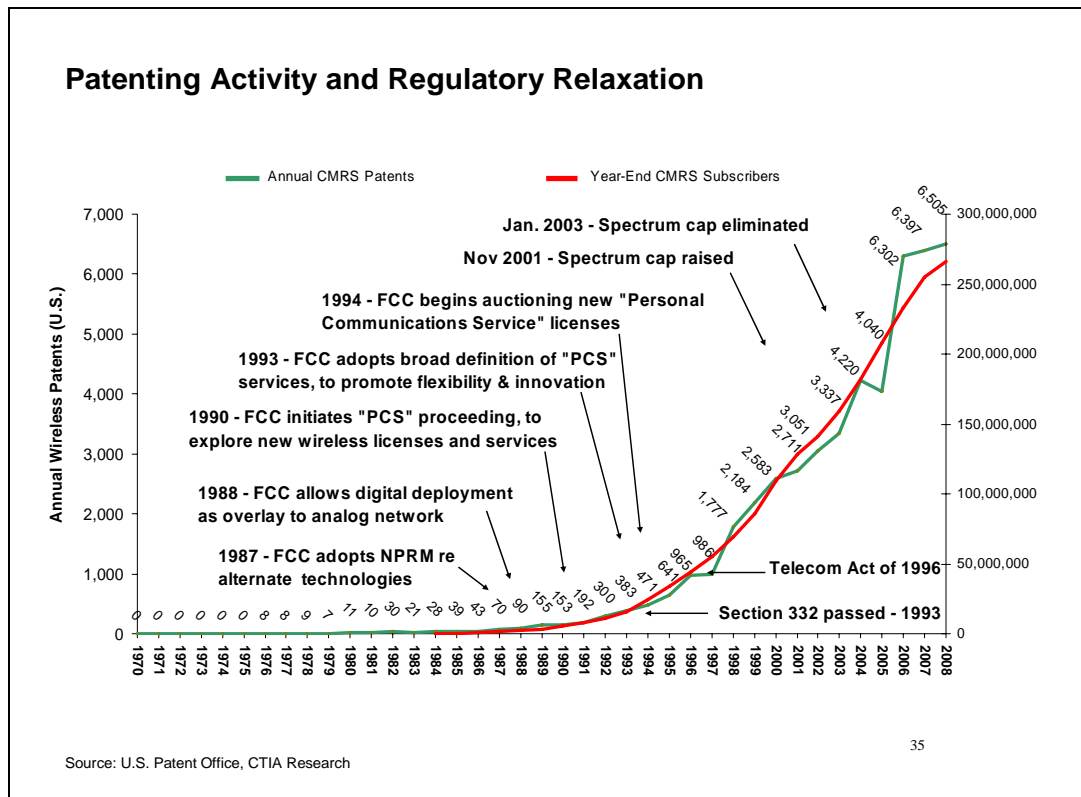


Figure 10. Patenting Activity and Regulatory Relaxation

As noted, the ecosystem did not evolve overnight; it has relied on ongoing innovation and investment spanning more than 30 years and continues at a furious pace today. Wireless providers never stop innovating their networks. Initially, wireless service providers focused on basic voice service, and advancements in the network revolved around improving the voice feature set with applications like voice mail and caller ID.¹⁷ The virtuous cycle of innovation then led to the development of basic narrowband data applications, and carriers made available to consumers “walled gardens” of content that were optimized to function on the narrowband network.¹⁸ Now, the focus is on speed, capacity and capability as service providers work with others in the mobile wireless ecosystem to provide high speed broadband, video, and other multi-function capabilities –

¹⁷ See Kellye Whitney, *The Evolution of Wireless Technology* (June 2006), available at <http://www.certmag.com/read.php?in=2054> (last visited Sept. 23, 2009).

¹⁸ See Mark Toner, *Mobilized: The Cincinnati Enquirer* (July 31, 2008), available at <http://www.naa.org/Resources/Articles/Digital-Media-Moving-To-Mobile-CincyMobile-Case-Study/Digital-Media-Moving-To-Mobile-CincyMobile-Case-Study.aspx> (last visited Sept. 23, 2009).

while other elements of the virtuous cycle develop new devices, products and applications.¹⁹

Today's wireless networks are offering "broadband to the person," *i.e.*, communication that is personal, customized and empowering, wherever and whenever the user wants it.²⁰ American consumers now place a high value on mobile voice *and* broadband services. As quickly as the number of wireless voice subscribers has grown, the virtuous cycle of innovation and investment has caused the number of wireless broadband subscribers to grow even more dramatically. Mobile broadband additions are driving the growth of high-speed lines overall, and mobile broadband utilization rates are accelerating at breakneck speed.²¹ As service providers continue to innovate and invest in their networks, this trend will only continue.

Of course the virtuous cycle continues – and innovation is occurring across the entire mobile ecosystem, and not just with respect to broadband services. With wireless networks continuing to evolve, increased functionality and reliability allow providers to expand the use of the network for a variety of developing services and applications in areas like machine-to-machine, smart grid, mobile learning, and mobile health. Thus, the Commission should look across the entire wireless communications marketplace as it tracks innovation and investment in the industry.

B. Each Segment Of The Virtuous Cycle Represents Innovation And Investment, With Growth From Past To Present

Below, CTIA presents a brief snapshot of the innovation and investment that has occurred over time in the various segments of the virtuous cycle. The review reveals that developments in each segment spur innovation and investment in others, just as a virtuous cycle should.

¹⁹ See Douglas A. McIntyre, *The 24/7 Wall St. Interview With Ivan Seidenberg, CEO of Verizon* (Sept 21, 2009), available at <http://247wallst.com/2009/09/21/the-247-wall-st-interview-with-ivan-seidenberg-ceo-of-verizon/> (last visited Sept 24, 2009).

²⁰ See Comments of CTIA, GN Docket No. 09-51 (filed June 8, 2009) ("2009 CTIA Comments").

²¹ Nielsen Mobile, *Critical Mass: The Worldwide State of the Mobile Web* at 3 (July 2008) ("Nielsen Mobile").



1. Service Providers

As the Commission considers innovation and investment in the service provider segment of the mobile wireless ecosystem, it is important to note where the marketplace was just 15 years ago. Since the 1995 auction for Personal Communications Service (“PCS”) spectrum,²² the wireless market has exploded in a relatively short span. As shown below, a great majority of U.S. consumers have a significant number of wireless choices available to them.

Competition between wireless service providers is not limited to the largest urban areas, rather it extends broadly across the country. In the following two charts, CTIA demonstrates that there is vigorous competition in the top 10 largest MSAs in the nation, but also in the 10 least populous MSAs in the nation.

The following chart depicts the staggering levels of competition in the most populous MSAs:

²² See FCC Wireless Telecommunications Bureau, *Auction 4 Broadband PCS A and B Block Summary*, available at http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=4 (last visited Sept. 29, 2009).

Wireless carrier competition exists in U.S. urban areas that are large...

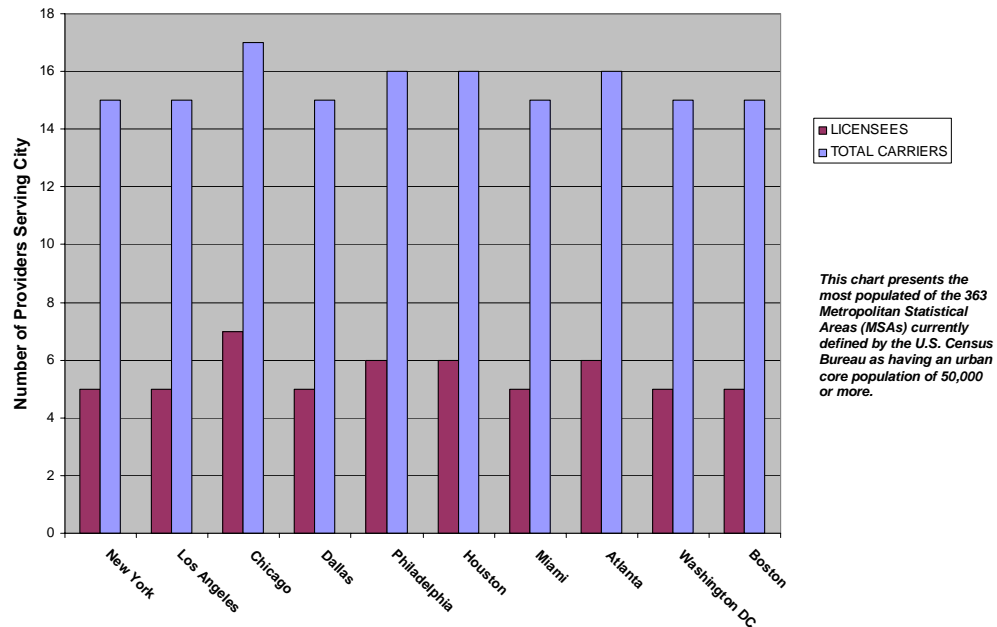


Figure 11. Licensees and Total Carriers in Most Populated MSAs

As depicted in this chart, there are no less than five facilities-based carriers in every one of these large U.S. metropolitan areas. Considering facilities-based and non-facilities based providers, there are no less than fourteen providers in each area. Given this abundance of wireless service providers, it is no surprise that we witness the intense competitive behavior described below.

As a complement to the chart above, CTIA also looked at the ten least populous of the 940 Core Based Statistical Areas (“CBSAs”) and also found an abundant number of service providers. Several of the ten markets had at least five facilities-based providers and none had less than three. Additionally, eight of the ten had fourteen or more total providers:

...and U.S. cities that are small!

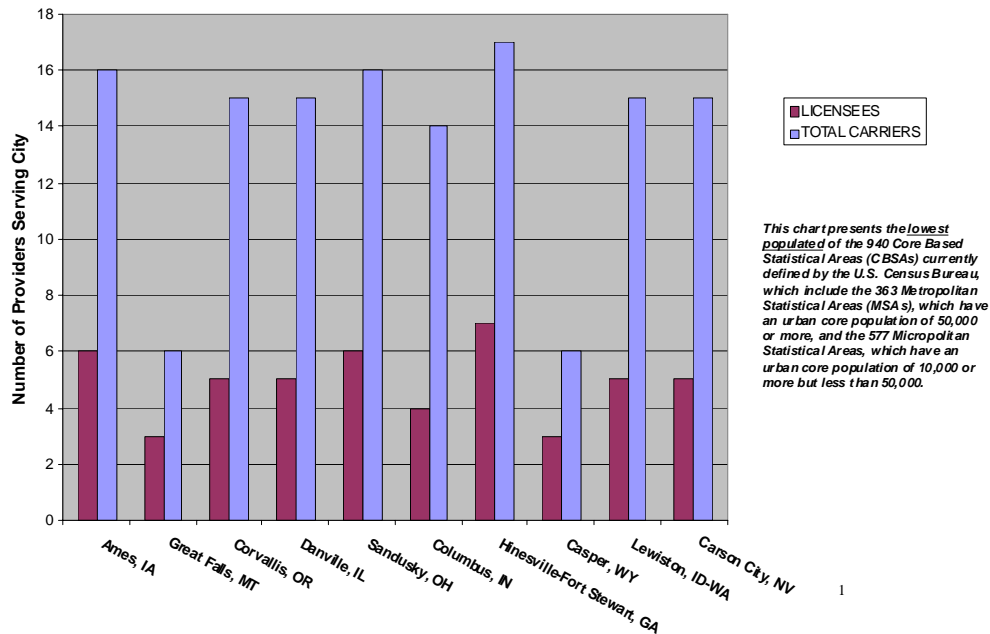


Figure 12. Licensees and Total Carriers in Least Populated CBSAs

Thus, it is clear that by any measure, consumers have abundant choices when selecting their wireless provider, and carriers compete vigorously for business.

Indeed, the FCC has found that 95.5 percent of Americans live in census blocks in which three or more wireless service providers offer services, and 90.5 percent live in census blocks where four or more wireless providers offer service.²³ As CTIA has demonstrated, American consumers have more choices than consumers in nearly every developed country in the world.²⁴ A review of Bank of America / Merrill Lynch's *Global Wireless Matrix 4Q08* data on the majority of the

²³ *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Thirteenth Report, at 26 (Table 1) (WTB Jan. 16, 2009) ("Thirteenth CMRS Competition Report").

²⁴ See Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 09-51 *et al.* (filed Aug. 14, 2009) ("CTIA August 14, 2009, *Ex Parte*").

countries that make up the Organisation for Economic Co-operation and Development (“OECD”) shows that the U.S. has the most competitive wireless market based on carrier choice.²⁵

Wireless Mobile Competition in OECD Countries, 4Q08					
Mobile Operator Market Share by Subscribership (%)					
Number of Operators	1	2	3	4	Others
Australia	40.7	32.6	18	8.7	
Austria	42.6	32.2	19.5	5.8	
Belgium	44.7	30.9	24.4		
Canada	36.8	30.6	28.4	2	2.2
Czech Republic	39.9	38.7	21.3		
Denmark	46.2	26.5	21.8	5.6	
Finland	39.5	37.5	23.1		
France	47.1	36.2	16.7		
Germany	36.5	33.7	16.6	13.2	
Greece	41.2	30.9	27.9		
Hungary	43.9	35.1	21.9		
Italy	38.5	33.2	18.7	9.7	
Japan	49.6	28	18.3	4.2	
Korea	50.5	31.5	18		
Mexico	72.3	19.7	4.5	3.5	
Netherlands	49.8	27	23.1		
New Zealand	52.7	47.3			
Norway	55.4	44.6			
Poland	32.9	32.3	30.2	4.6	
Portugal	44.2	35.5	20.3		
Spain	45.0	31.5	21.7	1.8	
Sweden	46.6	29.3	16.6	7.4	
Switzerland	61.9	20.4	17.8		
Turkey	55.7	25.2	19.1		
United Kingdom	25.5	25.1	22	20.9	6.5
United States	28.5	26.7	18.2	12.1	14.5
* The figure for the third U.S. carrier was increased to account for their wholly-owned MVNO subsidiary.					

Source: Bank of America / Merrill Lynch, “Global Wireless Matrix 4Q08”





Table 13. Wireless Mobile Competition in OECD Countries, 4Q08

There are presently more than 140 wireless providers in the U.S., and although each of these carriers is different in scale and scope, each of them competes vigorously in the marketplace. As

²⁵ *Id.* at 6.

providers invest in their networks and expand coverage, capacity, and capabilities, they drive opportunities for innovation throughout the mobile ecosystem – all to the benefit of consumers.

The combination of highly efficient networks and advanced wireless devices has made U.S. carriers the most efficient users of spectrum worldwide – serving more consumers, with less spectrum, and for more minutes of use than any other country. With access to just 409.5 MHz of spectrum (which includes AWS and 700 MHz spectrum, much of which is not yet deployed, as well as 55.5 MHz of 2.5 GHz BRS spectrum), the U.S. wireless industry serves well over 270 million subscribers – more than 660,000 consumers per megahertz of spectrum. Moreover, these 660,000 customers (per megahertz) also use their service at a much higher rate than our foreign counterparts.

	 USA	 Japan	 Germany	 U.K.	 France	 Italy	 Canada	 Spain	 S. Korea	 Mexico
Subscribers**	270.3m	110.6m	107.0m	76.8m	57.5m	89.9m	21.7m	53.1m	46.2m	79.4m
Average Consumers' Minutes of Use per Month**	830	134	102	193	251	128	420	149	306	170
Average Revenue per Minute – A Measure of the Effective Price per Voice Minute**	\$0.05	\$0.25	\$0.15	\$0.10	\$0.14	\$0.15	\$0.08	\$0.19	\$0.07	\$0.06
Efficient Use of Spectrum -- Subscribers Served per MHz of Spectrum Allocated	660,073	314,985	350,819	217,687	153,497	288,696	105,853	148,324	198,283	661,666
Spectrum Assigned for Commercial Wireless Use	409.5 MHz*	347 MHz	305 MHz	352.8 MHz	374.6 MHz	311.4 MHz	205 MHz	358 MHz	233 MHz	120 MHz
Potentially Usable Spectrum/In the Pipeline***	50 MHz	165 MHz	340 MHz	355 MHz	72 MHz	254 MHz				120 MHz

*Figure includes AWS-1, 700 MHz spectrum not yet in use and 55.5 MHz of spectrum at 2.5 GHz.
 ** Glen Campbell, et al., "Global Wireless Matrix 1009," Merrill Lynch, June 25, 2009, at Table 1.
 ***Complete information on "pipeline" spectrum was not available for all countries at the time of filing/publication.

Figure 14. Efficient Use of Spectrum

Sources: Bank of America / Merrill Lynch, CTIA Research, European Radio Office and Government websites.

Service providers now make available to U.S. consumers a number of wireless devices that leverage other wireless platforms, like Wi-Fi. These devices can access any Wi-Fi hotspot, not just those branded by the carriers, and enable the use of the Wi-Fi connection for data delivery – and in some cases, voice service. Carriers across the country, including each of the national carriers, offer handsets with integrated Wi-Fi, and there are at least 29 handsets featuring Wi-Fi on the market, with many more on the way.²⁶ Unlicensed Mobile Access (“UMA”) – the seamless switching of voice and data sessions between the commercial wireless network and Wi-Fi – is another area of Wi-Fi access where American wireless companies are leading the world in innovation and investment. Twelve of the 26 dual-mode handsets available worldwide are sold in the U.S.²⁷ and of all wireless providers worldwide, only eight offer UMA service, and two of them are in the U.S.²⁸

And wireless providers are leveraging other platforms as well. For example, on September 30, 2009, AT&T and Terrestrial Networks announced plans to offer an integrated solution combining AT&T’s primary cellular wireless connectivity with the ability to connect to Terrestrial’s satellite network as a backup, using one phone number and one smartphone device. Aimed primarily at enterprise and government users, TerreStar will offer its Genus™ dual-mode cellular / satellite

²⁶ See Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 09-51 *et al.*, at 12 (filed May 12, 2009) (*CTIA May 12, 2009 Ex Parte*).

²⁷ See UMA Today, *Dual Mode Handsets*, available at <http://www.umatoday.com/mobileHandsets.php> (last visited Sept. 24, 2009); see also T-Mobile USA, Inc., available at <http://www.t-mobile.com/shop/phones/> (last visited Sept. 24, 2009); and Cincinnati Bell Inc., available at http://www.cincinnati-bell.com/consumer/wireless/phones_and_devices/?view=fusionwifi (last visited Sept. 24, 2009).

²⁸ See UMA Today, *UMA Operators*, available at <http://www.umatoday.com/operators.php> (last visited Sept. 24, 2009); see also, T-Mobile USA, Inc., *T-Mobile Unlimited HotSpot Calling*, available at <http://www.theonlyphoneyouneed.com> (last visited Sept. 24, 2009); and Cincinnati Bell Inc., *Why Fusion Wifi*, available at http://www.cincinnati-bell.com/consumer/wireless/fusion_wifi/ (last visited Sept. 24, 2009).

smartphone to enable users to access TerreStar's satellite network when AT&T's cellular wireless network is unavailable.²⁹

In addition, as a group, and under the aegis of CTIA, the mobile wireless industry has been innovative in developing industry solutions to consumer concerns. The industry has taken leadership positions with voluntary guidelines addressing a host of issues including a Consumer Code;³⁰ Wireless Content Guidelines;³¹ Best Practices and Guidelines for Location-Based Services;³² and Best Practices and Guidelines for Mobile Financial Services.³³ And while Rep. Edward Markey (D-MA) identified mobile phone chargers as a concern during a recent FCC oversight hearing,³⁴ CTIA already had announced its commitment to support a common format for wireless phone chargers, known as the "Universal Charging Solution" ("UCS").³⁵

Of course, it cannot be emphasized enough that access to spectrum starts the virtuous cycle for service providers, and exclusive-use, flexible rights spectrum paves the way for innovation and

²⁹ See Press Release, AT&T, AT&T Announces Agreement with Terrestrial to Offer Integrated Cellular / Satellite Solution, (Sept. 30, 2009), *available at* <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27180>; *see also* Press Release, Terrestrial Networks, Terrestrial Announces Distribution Agreement with AT&T (Sept. 30, 2009), *available at* <http://www.terrestrial.com/press/20090930.html>.

³⁰ See CTIA Consumer Code for Wireless Service, *available at* http://files.ctia.org/pdf/The_Code.pdf (last visited Sept. 24, 2009).

³¹ See CTIA Wireless Content Guidelines, *available at* <http://www.ctia.org/content/index.cfm/AID/10394> (last visited Sept. 24, 2009).

³² CTIA Best Practices and Guidelines for Location -Based Services (Apr. 2, 2008), *available at* http://files.ctia.org/pdf/CTIA_LBS_BestPracticesandGuidelines_04_08.pdf (last visited Sept. 29, 2009).

³³ CTIA Best Practices and Guidelines for Mobile Financial Services (Jan. 28, 2009), *available at* http://files.ctia.org/pdf/CTIA_MFS_Guidelines_BP_Final_1_14_09.pdf (last visited Sept. 29, 2009).

³⁴ See Kim Hart, *FCC chief gets new net neutrality support in House from Waxman* (Sept. 17, 2009), *available at* <http://thehill.com/component/content/article/545-technology/59329-fcc-chief-gets-new-net-neutrality-support-in-house> (last visited Sept. 24, 2009).

³⁵ See Press Release, CTIA, CTIA-The Wireless Association® Announces One Universal Charger Solution to Celebrate Earth Day (Apr. 22, 2009), *available at* <http://www.ctia.org/media/press/body.cfm/PRID/1817>. "Developed by the Open Mobile Terminal Platform industry standards group and recently adopted by the GSMA, the UCS aims to reduce energy consumption and enhance the customer experience through the adoption of a single "one-charger-fits-all" solution for new wireless devices by January 1, 2012. The UCS will use the Micro-USB format as the common universal charging interface, and use energy efficient chargers in compliance with U.S. "Energy Star" requirements for external power adapters that will provide an estimated 50 percent reduction in standby energy consumption."

investment as discussed below. At some point, however, consumer demand will simply outstrip spectrum supply – there is a finite limit to how much capacity even the most advanced network carrier can squeeze out of its last mile wireless networks.



2. Infrastructure Vendors (Networks)

A wireless carrier's service is only as good as the network it rides on. The transformation of the network from voice-centric to multi-media confirms the significant levels of innovation and investment that have occurred in the network over the past 30 years. From first generation analog networks focused on voice calls to the broadband and video capabilities of today's systems – the developments are staggering. Now, we are entering an entirely new phase with LTE and WiMAX deployments that will further advance the virtuous cycle of innovation and investment in the wireless sector. A visual depiction of the changing generations of wireless network technology is set forth below.

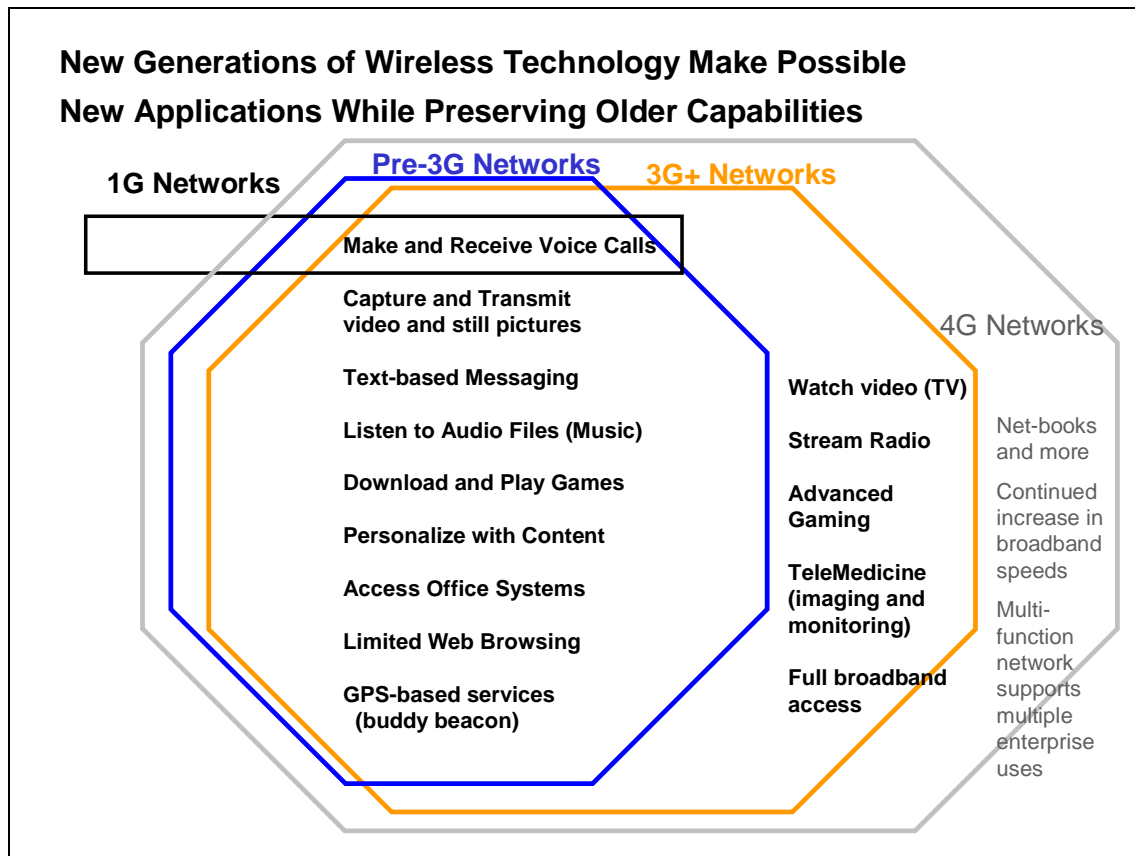


Figure 15. New Generations of Wireless Technology Make Possible New Applications

Service providers are constantly working with their infrastructure suppliers to expand and upgrade their networks, and over the past several years have deployed high-speed networks to reach more than 234 million people. Third generation (“3G”) broadband technologies EV-DO Rev. A and HSPA offer download speeds of up to 7.2 Mbps and higher.³⁶ More high-speed facilities are being deployed every day, and providers are transitioning to 4G technologies (generally LTE or WiMAX) with downlink speeds multiple times faster than current 3G technologies.

To maintain their competitive edge, carriers continue to innovate and invest in their infrastructure. AT&T³⁷ and T-Mobile³⁸ have both undertaken major expansions of their 3G

³⁶ See Don Ngo, *Faster AT&T 3G on its way, slowly* (Sept. 10, 2009), available at http://reviews.cnet.com/8301-19512_7-10349769-233.html (last visited Sept 29, 2009)

³⁷ See Press Releases, AT&T, *AT&T to Invest More Than \$17 Billion in 2009 to Drive Economic Growth* (March 10, 2009), available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26597>.

networks in 2009.³⁹ Other carriers, including Verizon Wireless,⁴⁰ already have started planning for their 4G networks, to bring even more speed and flexibility to American consumers in the near future. Meanwhile, Clearwire is utilizing WiMAX to create an open mobile broadband network that currently is available in 14 markets with plans to serve an additional 66 markets by the end of 2010.⁴¹ Additionally, Tier II and Tier III carriers continue to evolve their networks. For example, U.S. Cellular has announced that it continues to upgrade its CDMA network and that more than 60 percent of its cell sites will be EV-DO capable by the end of this year.⁴²

The infrastructure segment also continues to innovate and develop new product technologies and approaches to enhance coverage and capacity of the network.⁴³ For example, the industry is increasingly embracing the use of distributed antenna systems (“DAS”) and other smart antenna technologies to improve network coverage. In fact, AT&T just completed the installation of a DAS

³⁸ See Press Release, T-Mobile, T-Mobile USA Further Expands Commercial 3G Network Availability in 2008 (Oct. 17, 2008), *available at* http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20081017&title=T-Mobile%20USA%20To%20Offer%20New%203-G-Enabled%20Smartphone.

³⁹ The deployment of 3G technology is not limited to the largest carriers. Many smaller wireless carriers offer wireless broadband coverage to their consumers. For example, Alaska Communications Systems (“ACS”) and Bluegrass Cellular are offering 3G wireless broadband service in rural areas of Alaska and Kentucky, respectively. Indeed, ACS was the first wireless carrier to deploy 3G wireless broadband services utilizing EV-DO technology. See Press Release, ACS, ACS Named “Best Wireless Provider” in Leading Alaska Survey (Aug. 31, 2009), *available at* <http://investors.alsk.com/releasedetail.cfm?ReleaseID=406087>; and Press Release, Blue Grass Cellular, Bluegrass Cellular Adds 3G Coverage in Russell County (Sept. 15, 2009), *available at* http://www.bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_russell_county.

⁴⁰ See Phil Goldstein, *Verizon's Melone details 4G plans for backhaul, antennas and backup power* (Sept. 22, 2009), *available at* http://www.fiercewireless.com/story/verizons-melone-stresses-collaboration-4g/2009-09-22?utm_medium=rss&utm_source=rss&cmp-id=OTC-RSS-FW0 (last visited Sept. 28, 2009).

⁴¹ See Press Release, Clearwire, Clearwire to Officially Launch CLEAR 4G Service in 10 Markets on September 1, 2009 (Aug. 3, 2009), *available at* <http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1315679&highlight=>.

⁴² See Sarah Reedy, *US Cellular accelerates EV-DO push, weighing LTE trial* (May 6, 2009), *available at* <http://telephonyonline.com/wireless/news/us-cellular-evdo-upgrade-0506/> (last visited Sept. 24, 2009).

⁴³ Vendors also work very closely with service providers to develop creative network management strategies. Most recently, Sprint Nextel and Ericsson announced a relationship under which Ericsson will manage operations of the Sprint Nextel network. See *Sprint Nextel Ericsson Network Deal: Seven Year Agreement Worth 5 Billion* (July 10, 2009) *available at* <http://www.phonesreview.co.uk/2009/07/10/sprint-nextel-ericsson-network-deal-seven-year-agreement-worth-5-billion/> (last visited Sept. 24, 2009).

system inside the new Dallas Cowboys stadium.⁴⁴ The network consists of more than 500 strategically placed antennas distributed throughout the stadium and provides integrated cellular coverage indoors and outside the stadium.

In addition, the development of femtocells to improve network coverage and capacity is a great example of the virtuous cycle of innovation and investment in the infrastructure segment. Femtocells are essentially personal cell towers installed in a home. These devices resemble a computer modem in size, receive nearby cell phone signals, and transmit the signals over a broadband connection. A number of carriers including AT&T, Verizon Wireless, and Sprint have made femtocells available to consumers, and some analysts predict that sales will jump eightfold in 2009 from the 100,000 sold in 2008.⁴⁵



3. Device Manufacturers

While there is an ongoing debate about the potential benefits and harms of exclusive contracts and therefore service provider access to certain wireless devices, there can be no debate about the innovation and investment that has occurred in the device segment market over the past 30 years, particularly over the last few years. According to CTIA research, there are more than 630 handsets manufactured for the U.S. market, compared to fewer than 180 in the U.K.⁴⁶ As outlined below, there are at least 32 companies manufacturing devices into the U.S. market:

⁴⁴ See *AT&T Provide Boost To Cowboys Stadium Mobile Connectivity* (Sept. 18, 2009), available at <http://www.stadiatech.com/7266> (last visited Sept. 24, 2009).

⁴⁵ See Andrew Berg, *AT&T Launches Femtocell Solution* (Sept. 21, 2009), available at <http://www.wirelessweek.com/News/2009/09/ATT-Femtocell-Solution/> (last visited Sept. 24, 2009); and Chris Gaylord, *Your Own Personal Cell Phone Tower* (Sept. 14, 2009 ed.), available at <http://features.csmonitor.com/innovation/2009/09/14/your-own-personal-cell-phone-tower> (last visited Sept. 24, 2009).

⁴⁶ See *CTIA August 14, 2009* at Attachment: Handset Innovation.

HANDSET MANUFACTURERS PRODUCING/SELLING IN THE U.S.		
Alcatel	HTC	PCD
Apple	Huawei	Research in Motion
ASUS	Jitterbug	Samsung
Axxesstel	Kyocera	Sanyo
BandRich	LG	Sharp
BenQ	Motorola	Siemens
Cal-Comp	Nokia	Sierra Wireless
Casio	Novatel Wireless	Sony Ericsson
Firefly	Option	Uniden
HP	Palm	Waxess USA
	Pantech & Curitel	ZTE

Table 16. List of Device Manufacturers Producing/Selling In The U.S.

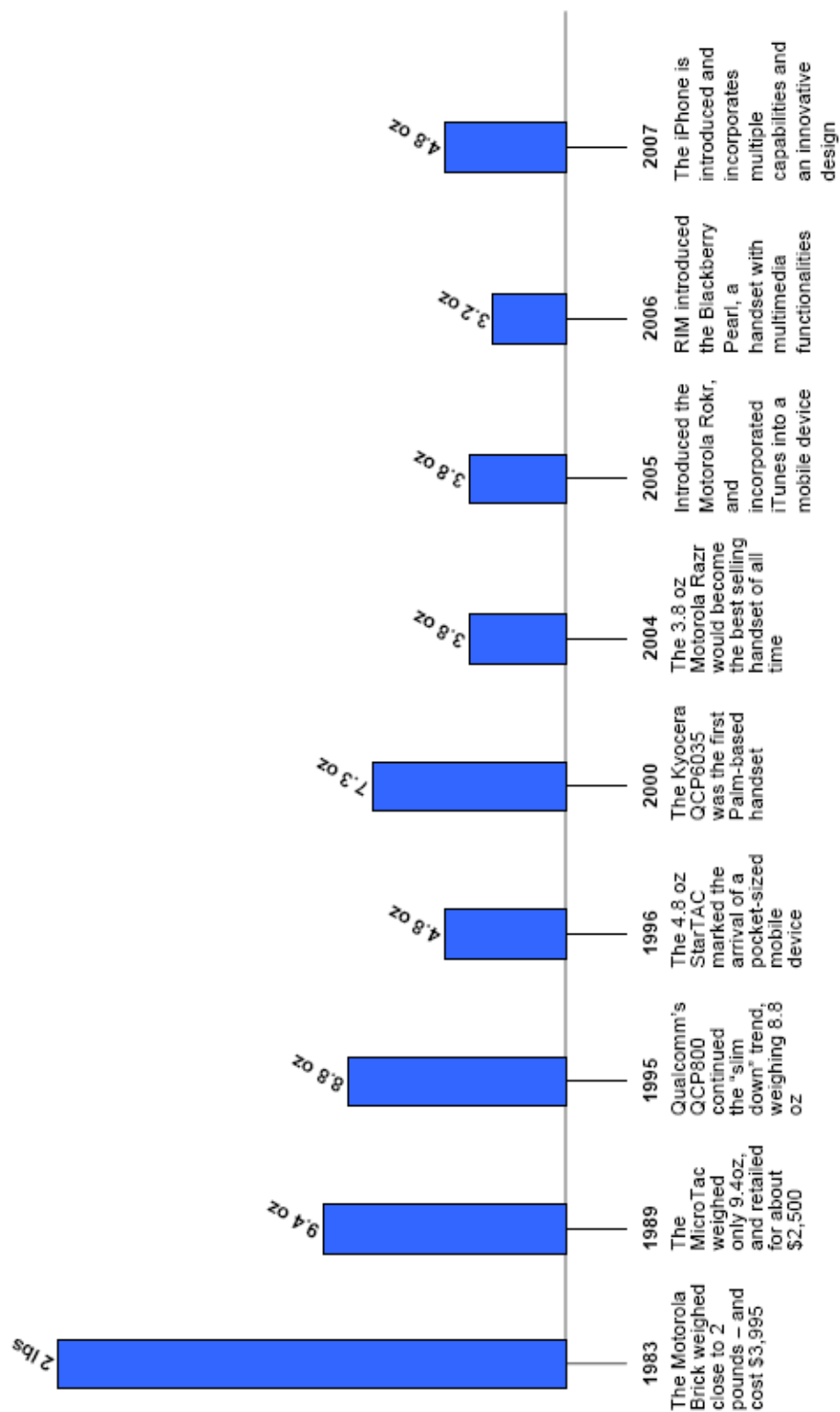
The evolution of wireless devices is extraordinary. As detailed in Figure 17 below, innovation and investment have been a consistent presence in this segment of the virtuous cycle with regular advances and achievement of notable industry milestones. From reductions in price and size to increases in capacity and functionality, the developments in the device marketplace reflect the innovation and investment that pervade the wireless ecosystem. These devices range from simple, streamlined models like the Jitterbug⁴⁷ (geared to consumers who want simple handsets that just enable voice calling), to multi-function devices like the Apple iPhone and other smartphones. More than 89 percent of the handsets operating on wireless carriers' networks are capable of browsing the web.⁴⁸ Each of the top five wireless providers in the U.S. offers Wi-Fi enabled handsets.⁴⁹ Moreover, competition is vigorous with device manufacturers aggressively developing new products in order to increase even the smallest amount of market share.⁵⁰

⁴⁷ See Jitterbug, available at <http://www.jitterbug.com/> (last visited Sept. 29, 2009).

⁴⁸ See CTIA's Wireless Industry Indices: Semi-Annual Data Survey Results: A Comprehensive Report from CTIA Analyzing the U.S. Wireless Industry, Mid-Year 2009 Results (forthcoming) at 10.

⁴⁹ See *supra* Section 1.B.1.

⁵⁰ See Sara Silver, *Samsung Overtakes Motorola In the U.S.* (Nov. 7, 2008) available at <http://online.wsj.com/article/SB122602057978207237.html> (last visited Sept. 22, 2009).



Source: CTIA Research

Figure 17. Innovation Has Shrunk Wireless Handsets and Offered Increased Capabilities to Consumers

The smartphone market expanded in a major way in 2008, enabling consumers to get access to mobile technology that had previously only seen major penetration in the enterprise marketplace. Prior to this period, the smartphone market had not yet exploded. In fact, in mid-2008, the hottest selling handset was the Motorola RAZR.⁵¹ Yet as one industry observer noted, “[t]he displacement of the RAZR by the iPhone 3G represents a watershed shift in handset design from fashion to fashionable functionality.... Four of the five best-selling handsets in the third quarter were optimized for messaging and other advanced Internet features.”⁵² Of course, the hottest development in the device space is the explosive growth in the sale of smartphones.⁵³ Figure 18 below visually illustrates the innovation and investment in this segment that has resulted in the wide range of functions found in today’s smartphones.

⁵¹ Press Release, The NPD Group: iPhone 3G Leads U.S. Consumer Mobile Phone Purchases in the Third Quarter of 2008 (Nov. 10, 2008), *available at* http://www.npd.com/press/releases/press_081110.html (quoting remarks by Ross Rubin, Director of Industry Analysis for NPD).

⁵² *Id.*

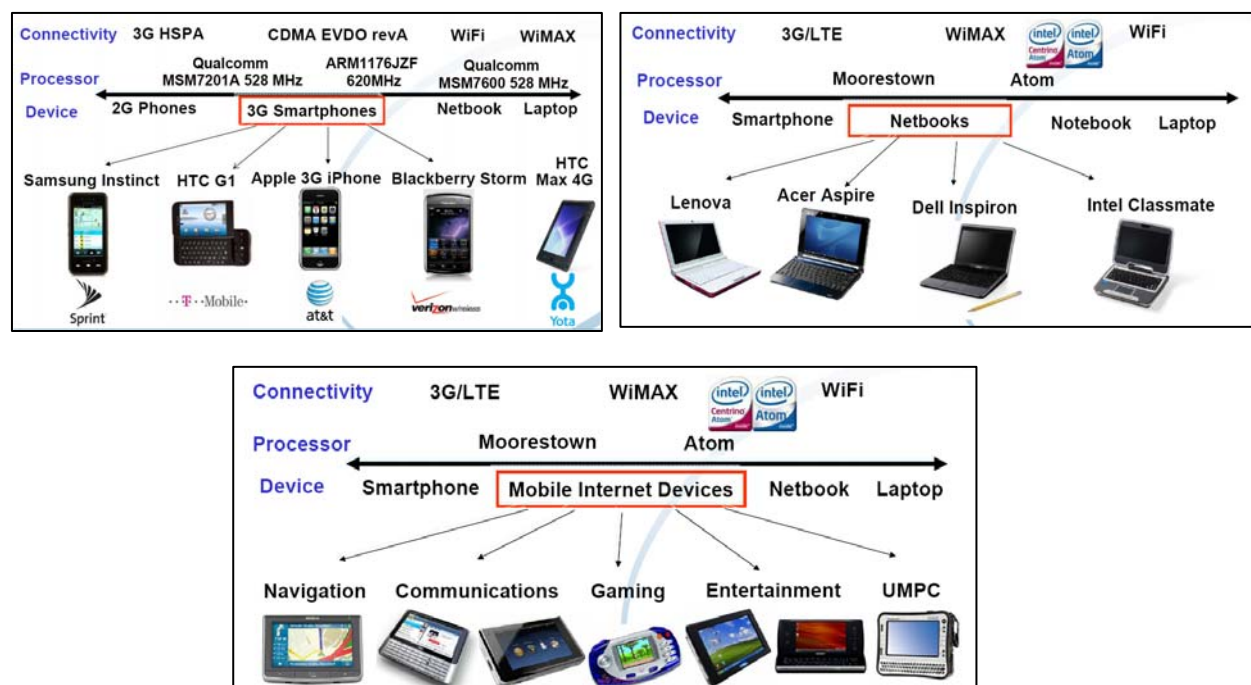
⁵³ *See infra* Section III.B.



Source: Qualcomm

Figure 18. Making Wireless Devices Multi-Function Tools

Today, we see device manufacturers competing with the latest aircards and netbooks to provide access to the wireless broadband networks.⁵⁴ In fact, at the end of 2008, carriers reported more than seven million wireless-enabled laptops, netbooks and aircards on their networks.



Sources: CTIA Research, Yankee Group 2008
Figure 19. Wireless Laptops, Netbooks and Aircards on Carrier Networks, 2008

Moreover, the industry is seeking to expand network access and use by a diverse group of players. For example, Verizon Wireless has launched its Open Development Initiative to provide customers the option to use, on its nationwide wireless network, wireless devices, software and applications not offered by the company.⁵⁵ Similarly, Alcatel-Lucent has helped launch the NG Connect Program to bring together infrastructure, device, application and content companies to create an end-to-end ecosystem with all the resources and expertise required to rapidly deliver next

⁵⁴ See, e.g., Elaine Sanfilippo, *Analyst Angle: Netbooks gaining traction with consumers* (Sept. 23, 2009), available at <http://www.rcrwireless.com/article/20090923/FRONTPAGE/909169994/analyst-angle-netbooks-gaining-traction-with-consumers> (last visited Sept. 24, 2009).

⁵⁵ See Verizon Wireless, *Welcome to Open Development*, available at <https://www22.verizon.com/opendev/> (last visited Sept 29, 2009).

generation services and applications.⁵⁶ Finally, Sprint, through its Open Device Initiative has certified more than 300 third-party devices for use on its mobile broadband network.⁵⁷ Devices range from the Amazon Kindle to M2M DataSmart's wholesale cellular data airtime services for emerging machine-to-machine ("M2M") applications.⁵⁸ These are just a few of the many examples of how service providers, device manufacturers, and infrastructure providers are continuing the virtuous cycle of innovation and investment in the device segment.



4. Operating Systems Developers

As consumers and enterprise users became more reliant on mobile connectivity, the virtuous cycle has resulted in increased demand for a mobile experience capable of using applications more traditionally found on home or office computers.⁵⁹ Indeed, the applications and uses of mobile devices are near limitless – from email, text messaging and word processing, to web browsing, digital photography, and video programming. They rely however on sophisticated software platforms necessary to run these demanding devices and applications.

Mobile operating systems are important because they manage both the hardware features of the device, such as the antennas, camera, touch screen, thumbwheel and keyboards, as well as software applications like email, text-messaging, web browsing, GPS functionality and other

⁵⁶ See NG Connect Program, available at <http://www.ngconnect.org/> (last visited Sept 29, 2009).

⁵⁷ See Kansas City Business Journal, *Sprint, M2M DataSmart, partner to push wireless applications* (Sept. 1, 2009), available at <http://kansascity.bizjournals.com/kansascity/stories/2009/08/31/daily16.html> (last visited Sept. 29, 2009).

⁵⁸ *Id.*

⁵⁹ See John Markoff, *The Cellphone Navigating Our Lives* (Feb. 16, 2009), available at <http://www.nytimes.com/2009/02/17/science/17map.html> (last visited Sept. 29, 2009).

applications.⁶⁰ Mobile operating systems are responsible for how these functions and features interact. Since current generation smartphones feature increasingly sophisticated functions, the virtuous cycle drives software and hardware providers to develop increasingly sophisticated operating system platforms.

In recent years, the mobile ecosystem has seen a significant level of innovation and investment among developers, many of which have introduced platforms that were non-existent just a few years ago. Android, Symbian, PalmOS, Palm WebOS, RIM BlackBerry, Windows Mobile, Qualcomm BREW, Sun Java, open source Linux for Mobile, and Apple iPhone OS are all operational in the U.S. The innovation and investment in the mobile operating system space is staggering as service providers across the globe strive to distinguish their services from competitors. One commenter described this competition as “a battle among some of the world’s biggest software companies to create the operating system for the world’s phones (of which there are now 4 billion).”⁶¹

Notably, in an effort to stay ahead of the innovation curve, there is a major push towards open source software in the mobile wireless world, and the ecosystem is embracing it as a way to provide consumers with even more flexibility from their mobile handsets.⁶² Google’s Android mobile operating system saw its first major handset release with T-Mobile’s G1,⁶³ as T-Mobile and

⁶⁰ “Android breaks down the barriers to building new and innovative applications. For example, a developer can combine information from the web with data on an individual’s mobile phone -- such as the user’s contacts, calendar, or geographic location -- to provide a more relevant user experience. With Android, a developer can build an application that enables users to view the location of their friends and be alerted when they are in the vicinity giving them a chance to connect.” See Android, *What is Android?*, available at <http://www.android.com/about/> (last visited Sept. 29, 2009).

⁶¹ See Matt Richtel, *Google: Expect 18 Android Phones by Year’s End* (May 27, 2009), available at <http://bits.blogs.nytimes.com/2009/05/27/google-expect-18-android-phones-by-years-end/> (last visited Sept. 21, 2009).

⁶² “Android is open source; it can be liberally extended to incorporate new cutting edge technologies as they emerge. The platform will continue to evolve as the developer community works together to build innovative mobile applications.” Android, *What is Android?*, available at <http://www.android.com/about/> (last visited Sept. 29, 2009).

⁶³ See Martyn Williams and James Niccolai, *T-Mobile’s Android-based G1 goes on sale* (Oct. 22, 2008), available at http://www.computerworld.com/action/article.do?command=viewArticleBasic&taxonomyName=mobile_and_wireless&articleId=9117740&taxonomyId=15&intsrc=kc_top (last visited Sept. 24, 2009).

Sprint are members of the Open Handset Alliance.⁶⁴ Verizon Wireless is participating in the LiMo Foundation, an open source group working on expansion of the popular open-source Linux operating system to mobile handsets.⁶⁵ In June 2008, Nokia and others announced the intention to create the Symbian Foundation to extend the reach of the Symbian software platform. The Foundation has committed “to moving the platform to open source during the next two years, with the intent to use the Eclipse Public License. This will make the platform code available to all for free, bringing additional innovation to the platform and engaging even a broader community in future developments.”⁶⁶ These are profound developments that will spur even greater innovations in the mobile wireless ecosystem and reveal how truly fluid market shares for mobile operating systems are in the mobile wireless ecosystem:

<u>Smartphone Market Shares 2Q 2009</u>		<u>Smartphone Market Shares 2Q 2008</u>	
Symbian OS	50.3%	Symbian OS	58.2%
BlackBerry OS	20.9%	BlackBerry OS	16.7%
iPhone OS	13.7%	Windows Mobile	14.3%
Windows Mobile	9.0%	iPhone OS	2.1%
Android	2.8%	Android	0.0%
Others	3.3%	Others	8.6% ⁶⁷

Table 20. Changes in Wireless Operating System Market Shares, 2Q 2008 - 2Q 2009

It is striking the two newest operating systems – iPhone OS and Android – now hold more than 15% market share. The iPhone OS only debuted in June 2007, while the initial Android system was not released until October 2008. With systems providers regularly offering software

⁶⁴ See Press Release, Sprint, Sprint Joins Open Handset Alliance (Nov. 5, 2007), *available at* http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1072575&highlight=handset.

⁶⁵ See Eric Benderoff, *Verizon Takes A 'Googley' Approach To Software* (May 14, 2008), *available at* http://featuresblogs.chicagotribune.com/eric2_0/2008/05/verizon-takes-a.html#more (last visited Sept. 24, 2009).

⁶⁶ See Press Release, Symbian Foundation, Mobile Leaders To Unify The Symbian Software Platform And Set The Future Of Mobile Free (June 24, 2008), *available at* http://www.symbian.org/media/news/pr2008_1.php.

⁶⁷ *Id.*

updates, new system improvements, and increased “application” functionality, this sector of the mobile ecosystem will continue to thrive.



5. Application Developers

Until recently, the applications that did exist for mobile phones largely consisted of ringtones and basic arcade-style games. Cell phones did not have the processing capacity, display capability, memory, and connectivity necessary to create the experience most users were accustomed to on their personal or workplace computers.⁶⁸ But the appeal of mobility, the upgrade in carrier networks, and the development of advanced devices and smartphones have resulted in tremendous innovation and investment in the applications space over the past two years. Consumers already have downloaded billions of applications, and are projected to download 6.67 billion by 2014.⁶⁹

With the increased ability to access the Internet on-the-go and significant growth and adoption of smartphones, an explosion of applications to run on these devices also has occurred. Application stores have launched onto the scene, but it is critical to note that wireless broadband users can reach outside the applications store framework to download and use applications available over the Internet.

⁶⁸ See Sharpe Engineering Inc., *Background*, available at http://www.sharpe.com/mob_hist.htm (last visited Sept 29, 2009).

⁶⁹ See Andrew Thomas, *Smartphone downloads to top 6.67 bn by 2014* (Aug. 12, 2009), available at <http://www.tgdaily.com/content/view/43606/97/> (last visited Sept. 24, 2009).

Apple's iTunes,⁷⁰ Google's Android, Nokia's Symbian platform,⁷¹ Palm's PalmOS platform,⁷² Palm's WebOS platform,⁷³ and Research in Motion's BlackBerry platform⁷⁴ now all have online stores dedicated to providing users access to applications for their wireless devices. Press reports indicate that Microsoft is planning a store for its Windows Mobile platform⁷⁵ while Verizon Wireless is planning its own Vcast App Store.⁷⁶ This element of the wireless ecosystem did not exist 18 months ago, and now boasts over 100,000 applications and growing.

⁷⁰ See <http://www.apple.com/iphone/apps-for-iphone/> (last visited Sept. 24 2009).

⁷¹ See Elizabeth Woyke, *Nokia's Gigantic App Store* (May 7, 2009), available at <http://www.forbes.com/2009/05/07/nokia-ovi-store-technology-wireless-nokia.html> (last visited Sept. 24, 2009)

⁷² See http://software.palm.com/us/html/top_products_treo.jsp?device=10035300025 and <http://appstore.pocketgear.com/palm/> (last visited Sept. 24, 2009).

⁷³ See <http://developer.palm.com/> (last visited Sept. 24, 2009).

⁷⁴ See <http://na.blackberry.com/eng/services/appworld/> (last visited Sept. 24, 2009).

⁷⁵ See, e.g., Brad Linder, "Windows Mobile Marketplace photos, rules released," Download Squad available at <http://www.downloadsquad.com/2009/05/05/windows-mobile-marketplace-photos-leaked-rules-released/> (last accessed Sept. 30, 2009); Nicholas Kolakowski, *Microsoft Windows Mobile 6.5 Will Debut in 3 LG Electronics Smartphones* (Sept. 3, 2009), available at <http://www.eweek.com/c/a/Mobile-and-Wireless/Microsoft-Windows-Mobile-65-Will-Debut-on-3-LG-Electronics-Smartphones-120351/> (last visited Sept. 22, 2009).

⁷⁶ See Marguerite Reardon, *Verizon challenges Apple with Vcast app store* (July 28, 2009), available at http://news.cnet.com/8301-1035_3-10297904-94.html (last visited Sept. 24, 2009).

The following chart shows the application stores that are available to consumers:

<u>Application Store</u>	<u>Date Launched</u>	<u>Number of Apps Available</u>
iTunes App Store	July 2008	> 85,000 ⁷⁷
Android Market	October 2008	> 10,000 ⁷⁸
Palm Software Store	January 2009	> 5,000 ⁷⁹
BlackBerry App World	April 2009	> 2,500 ⁸⁰
Nokia Ovi Store	May 2009	20,000 Apps and Media Files ⁸¹
Palm App Catalog	June 2009	45 ⁸²
Windows Mobile Marketplace	Expected Oct 2009	(600 expected) ⁸³

Table 21. Application Stores

In the short time since the iTunes App Store's launch – just over one year – more than 2 billion applications have been downloaded by consumers.⁸⁴ Even the Skype application, the subject of a pending proceeding before the Commission,⁸⁵ is available for download to any Windows Mobile device and a number of others on the Skype website.⁸⁶

⁷⁷ See Apple Hot News available at <http://www.apple.com/hotnews> (last visited Sept. 22, 2009).

⁷⁸ See Robin Wauters, *Android Market: 10,000+ Applications Strong Today* (Sept. 7, 2009), available at <http://www.washingtonpost.com/wp-dyn/content/article/2009/09/08/AR2009090802799.html/> (last visited Sept. 23, 2009).

⁷⁹ See Palm, *Top Downloads*, available at http://software.palm.com/us/html/top_products_treo.jsp?device=10035300025 (last visited Sept. 29, 2009), Palm, available at <http://appstore.pocketgear.com/palm/> (last visited Sept. 29, 2009).

⁸⁰ See <http://appworld.blackberry.com/webstore/content/reviews/1414> (last visited Sept. 22, 2009).

⁸¹ See Elizabeth Woyke, *Nokia's Gigantic App Store* (May 7, 2009), available at <http://www.forbes.com/2009/05/07/nokia-ovi-store-technology-wireless-nokia.html> (last visited Sept. 24, 2009).

⁸² See intoMobile, *Four New Apps Arrive in the App Catalog* (Aug. 28, 2009), available at <http://www.intomobile.com/2009/08/28/four-new-apps-arrive-in-the-app-catalog.html> (last visited Sept. 22, 2009).

⁸³ See *supra* n. 74.

⁸⁴ See <http://www.apple.com/hotnews> (last visited Sept. 30, 2009).

⁸⁵ Petition to Confirm a Consumer's Right to Use Internet Communications Software and Attach Devices to Wireless Networks, Skype Communications S.A.R.L., RM-11361 (filed Feb. 20, 2007).

⁸⁶ See <http://www.skype.com/download/skype/windowsmobile/> (last visited Sept. 24, 2009).

C. Investment And Innovation Are Occurring In All Corners Of The Wireless Ecosystem, Not Just In The Broadband Segment

Over the last decade, the mobile wireless marketplace has evolved in ways that demonstrate the high value American consumers now place on mobile voice and broadband services. The benefits of wireless networking, however, extend far beyond consumer or enterprise mobile broadband use. With the evolution from cell phones to smartphones and wireless data devices, enhanced network functionality, devices, and applications are improving healthcare, the environment, education, manufacturing efficiency, and workforce productivity.⁸⁷ Commission policies should encourage the continued innovation and investment in these critical areas, not negatively impacting the important expansion of the benefits of mobile wireless and mobile broadband. As we explain throughout this filing, CTIA is concerned that the expansion of net neutrality rules could have a significantly negative impact on the investment, innovation and – as a result – adoption of these services.⁸⁸

1. Improving Healthcare Management

Recent innovations in wireless technology and devices have begun to alter healthcare management in the U.S. in many different ways.

First, new smart phone devices are being used by many patients to obtain medical advice and instructions. More than 146 million American adults utilized the Internet to obtain health information in 2008⁸⁹ with much of this information obtained wirelessly. According to a recent study, more than 89 percent of users with wireless Internet connectivity sought health information

⁸⁷ *Innovation NOI* at ¶¶ 16-18.

⁸⁸ *See, e.g.,* Section V.D., *infra*.

⁸⁹ *See* California HealthCare Foundation, *Participatory Health: Online and Mobile Tools Help Chronically Ill Manage Their Care* (Sept. 2009), at 7 (“CA Health Study”) (citing Manhattan Research, *Cybercitizen Health™* v.8.0, *Catch the New Pharmaceutical Marketing Wave: Trends and Strategies for Reaching Today’s Healthcare Consumer* (Dec. 2008)).

online.⁹⁰ Another study predicts that the U.S. market for wireless home-based health care applications will grow from \$304 million in 2009 to more than \$4 billion in 2013, with estimated annual growth rates of 96 percent in 2010, 126 percent in 2011, 95 percent in 2012, and 68 percent in 2013.⁹¹

The increasing reliance on mobile devices for health information led to the creation of the Pill Phone Application, introduced by several wireless carriers in 2008, which allows individuals to look up drug interactions via their mobile device and to schedule pill reminders.⁹² Separately, the National Institute on Aging and the National Cancer Institute funded the creation of eMedMobile, a smart phone application that works with “smart labels” on prescription medication bottles and sends alerts to caregivers when a medication is skipped.⁹³ The explosion of medical applications available over mobile phones also is demonstrated by the applications available at Apple’s iTunes store and thus available over the iPhone. Zume Life, for example, is an iPhone application that allows patients to record all their daily health activities and on-going health conditions and provides patients medication reminders.⁹⁴ The information supplied by the patient is transmitted wirelessly to a website for physician monitoring. As of June 2009, there were over 500 medical applications available via iTunes and, according to O’Reilly Media, medical applications are the third-fastest growing category of applications available at iTunes.⁹⁵

Second, new wireless devices have been developed to improve the ability of patients with chronic illness to manage their conditions. Many of these devices are designed to improve patients’

⁹⁰ *CA Health Study* at 8 (citing results of the Pew Internet & American Life Project).

⁹¹ See Joseph Goedert, *Assessing Home Health Wireless Growth* (Aug. 6, 2009), available at http://www.healthdatamanagement.com/news/home_health-38778-1.html (last visited Sept. 28, 2009) (citing a report from Parks Associates).

⁹² *CA Health Study* at 9.

⁹³ *Id.* at 12.

⁹⁴ See ZumeLife, available at <http://www.zumelife.com/index.php> (last visited Sept. 29, 2009); *CA Health Study* at 15.

⁹⁵ *CA Health Study* at 9.

compliance with prescribed medication regimens, which is extremely important given that “as much as 60 percent of patients do not adhere to their prescribed medication regimens.”⁹⁶ For example, the MedMinder Systems’ wireless enabled pillbox has been deployed in a pilot program by Harvard Pilgrim Health Care for use by patients with chronic kidney disease.⁹⁷ The wireless pillbox “lights up, sounds alarms, places phone calls and even emails users for alerts and notifications” regarding their medication regime.⁹⁸ Similarly, the 2009 winner of the DiabetesMine Design Challenge transformed an iPhone into a combined glucose meter and insulin pump, with a storage container for strips.⁹⁹ By eliminating the need for diabetics to carry several devices, it increases the likelihood of regular monitoring.

Third, physicians increasingly rely on new applications and devices that utilize wireless technology to improve healthcare management. One such solution is the EMMA[®] system which links a patient’s home with the pharmacy and prescribing physician. A Medication Delivery Unit (“MDU”) is installed in the patient’s home and is enabled via a wireless, two-way connection that allows a physician to remotely manage the medication stored in the MDU.¹⁰⁰ Another device is a wireless tablet, recently certified for use on the Verizon Wireless network, that permits clinicians to access patient data wirelessly, in real-time from a portable medical chart.¹⁰¹ Likewise, a high-magnification microscope attachment (the “CellScope”) has been designed for cell phones that

⁹⁶ *Id.* at 12.

⁹⁷ See Brian Dolan, *Harvard Pilgrim to pilot wireless pillbox for CKD patients* (Aug. 31, 2009), available at <http://mobihealthnews.com/4153/harvard-pilgrim-to-pilot-wireless-pillbox-for-ckd-patients/> (last visited Sept. 28, 2009).

⁹⁸ *Id.*

⁹⁹ See Diabetesmine, *ANNOUNCING OUR WINNERS: The 2009 DiabetesMine™ Design Challenge* (May 18, 2009), available at <http://www.diabetesmine.com/2009/05/announcing-our-winners-the-2009-diabetesmine-design-challenge.html> (last visited Sept. 28, 2009).

¹⁰⁰ See EMMA, Understanding EMMA, available at <http://www.inrangesystems.com/index.php?page=understanding-emma> (last visited Sept. 29, 2009); see also *CA Health Study* at 8.

¹⁰¹ See Brian Dolan, *@CTIA Verizon on mHealth 4G* (Apr. 1, 2009), available at <http://mobihealthnews.com/1112/ctia-verizon-on-mhealth-4g/> (last visited Sept. 28, 2009).

would allow users to take images of sputum or blood samples and forward the images wirelessly for analysis.¹⁰² Due to its portability and affordability, this device can be used by health workers in remote areas and could be used to monitor disease outbreaks more quickly and affordably than with conventional technology.¹⁰³ With regard to mobile device applications used by physicians, a survey conducted by MDsearch found that 53 percent of responding physicians owned a smartphone and that 63 percent of those with smartphones used mobile medical applications over the device.¹⁰⁴

Fourth, new M2M wireless technologies hold the promise for significantly improving home health care. According to the California HealthCare Foundation, “[r]esearch has shown that using remote monitoring devices in a patient’s home, coupled with follow-up phone contact, can lower the cost of delivery while maintaining quality.”¹⁰⁵ A recent report predicted that M2M device shipments may top 430 million units by 2013,¹⁰⁶ with many of these devices in the healthcare sector. In this regard, Verizon Wireless, in partnership with Alcatel-Lucent and Ericsson, has launched a new 4G innovation center for M2M devices that will operate on the Verizon Wireless network.¹⁰⁷ Similarly, AT&T recently opened a device certification lab to accelerate the deployment of healthcare-related tracking devices.¹⁰⁸

¹⁰² See Brian Dolan, *White House: We are excited about wireless health* (July 21, 2009), available at <http://mobihealthnews.com/3345/white-house-we-are-excited-about-wireless-health> (last visited Sept. 29, 2009); Blum Center for Developing Economies, *CellScope for Disease Diagnosis*, available at <http://blumcenter.berkeley.edu/global-poverty-initiatives/mobile-phones-rural-health/remote-disease-diagnosis> (last visited Sept. 29, 2009).

¹⁰³ See Blum Center for Developing Economies, *CellScope for Disease Diagnosis*, available at <http://blumcenter.berkeley.edu/global-poverty-initiatives/mobile-phones-rural-health/remote-disease-diagnosis> (last visited Sept. 29, 2009).

¹⁰⁴ See Brian Dolan, *Survey: 63% physicians with smartphones use apps* (Sept. 11, 2009), available at <http://mobihealthnews.com/4354/survey-63-of-physicians-with-smartphones-use-apps/> (last visited Sept. 29, 2009).

¹⁰⁵ *CA Health Study* at 13.

¹⁰⁶ See Brian Dolan, *AT&T, Verizon, Sprint to fast-track health devices* (Sept. 3, 2009), available at <http://mobihealthnews.com/4221/att-verizon-sprint-to-fast-track-health-devices/> (last visited Sept. 29, 2009).

¹⁰⁷ See Brian Dolan, *@CTIA Verizon on mHealth 4G* (Apr. 1, 2009), available at <http://mobihealthnews.com/1112/ctia-verizon-on-mhealth-4g/> (last visited Sept. 28, 2009).

¹⁰⁸ See Brian Dolan, *AT&T, Verizon, Sprint to fast-track health devices* (Sept. 3, 2009), available at <http://mobihealthnews.com/4221/att-verizon-sprint-to-fast-track-health-devices/> (last visited Sept. 28, 2009).

Fifth, innovative thinking has resulted in wireless technology being utilized to deliver text messages with critical medical information to users. For example, Text4Baby is a maternal health initiative that was designed to help curb infant mortality in the U.S. This initiative will provide free tips to mothers three times a week before the birth, such as reminders to take a multi-vitamin, and will provide post-birth reminders, such as infant vaccinations.¹⁰⁹

Sixth, while hospitals in the past have tried to limit mobile device use in their buildings, administrators are now beginning to embrace the benefits of a fully wireless environment with multiple wireless networks co-existing to provide anywhere communications and real-time delivery of medical testing data and telemetry.¹¹⁰ Sprint, for example, has teamed with GE Healthcare, a division of GE, to offer in-building voice and data transmission. One of their most recent projects was with Methodist Healthcare in San Antonio, Texas, where a converged wireless infrastructure is being deployed at six hospitals. Based on Sprint's work, the new wireless infrastructure will be able to support WiMAX and other 4G technologies in the future.¹¹¹

The Commission should adopt policies that promote the growth of mobile health or “mHealth” in the U.S. In this regard, CTIA supports increasing lower-income consumers’ access to broadband through the Universal Service Lifeline and Link Up programs and encourages the Commission to adopt a program with sufficient funding to achieve that goal. Consistent with the discussion above, if low income consumers obtain access to wireless broadband, they will also have the ability to receive improved healthcare through mHealth applications and initiatives.

¹⁰⁹ See Brian Dolan, *Voxiva, CDC, White House to launch Text4Baby* (June 5, 2009), available at <http://mobihealthnews.com/2543/voxiva-cdc-white-house-to-launch-text4baby> (last visited Sept. 28, 2009). Wireless technology has also been identified as a possible tool in containing pandemics, such as the recent H1N1 outbreak. See Neil Versel, *Mobile communications could help contain H1N1 outbreaks* (Sept. 15, 2009), available at <http://www.fiercemobilehealthcare.com/story/mobile-communications-could-help-contain-h1n1-outbreaks/2009-09-15> (last visited Sept. 29, 2009).

¹¹⁰ See Carol Wilson, *Hospitals becoming wireless hotbeds* (Sept. 23, 2009), available at <http://telephonyonline.com/3g4g/news/hospitals-becoming-wireless-0923/> (last visited Sept. 24, 2009)

¹¹¹ *Id.*

2. Enabling Smart Grids

Congress has directed the Commission to develop a National Broadband Plan that includes “a plan for the use of broadband infrastructure and services in advancing . . . energy independence and efficiency.”¹¹² The Commission, in turn, has identified smart grids as a promising way to achieve these objectives and recently issued a Public Notice seeking comment on how advanced infrastructure and services could help achieve implementation of smart grids.¹¹³ A recent report issued jointly by Accenture and Vodafone found that wireless technology can be used to reduce carbon emissions in European Union (“EU”) member countries by 113 metric tons per year in carbon dioxide equivalent (“CO₂e”) and cut energy costs by £43 billion (approximately \$70 billion).¹¹⁴ According to the report, more than 80 percent of these savings would be attributable to smart M2M wireless communications.¹¹⁵ The implementation of smart grids utilizing wireless technology alone would reduce carbon emissions in the EU by approximately 43 metric tons CO₂e and save £11.4 billion (approximately \$18 billion) per year by 2020.¹¹⁶

As an initial matter, sound spectrum management policy dictates that the Commission promote smart grid deployments that utilize commercial wireless networks, rather than the establishment of new spectrum allocations or set asides dedicated to particular uses, such as smart grids or utility functions. In this era of increasing demand for spectrum, it would be inefficient to devote unique spectrum for the creation of new wireless smart grid networks when commercial networks can more efficiently satisfy the smart grid systems’ needs – and a host of other wireless uses at the same time. And, as discussed in more detail below, a number of utilities and

¹¹² American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 6001(k)(2)(D), 123 Stat. 115 (2009).

¹¹³ See Public Notice, Comment Sought on the Implementation of Smart Grid Technology, DA 09-2017 (Sept. 4, 2009).

¹¹⁴ Accenture and Vodafone, Carbon Connections: Quantifying Mobile’s Role in Tackling Climate Change at 4 (July 2009) (“Carbon Connections”).

¹¹⁵ *Id.* at 8.

¹¹⁶ *Id.* at 16.

manufacturers have already decided to take advantage of this expertise and employ CMRS networks for smart grid applications.

CMRS networks are an ideal solution for smart grid applications. These networks deliver economies of scope and scale and are designed to achieve interoperability. CMRS networks also utilize commercially available equipment. Smart grids should be designed to take advantage of similar commercially available equipment, rather than proprietary solutions designed for a single energy grid or company. Moreover, CMRS networks with 3G technology have been deployed to more than 92 percent of the U.S. population, using a variety of technologies to deliver 3G services including HSDPA (“High Speed Downlink Packet Access”), HSUPA (“High Speed Uplink Packet Access”), Evolved High Speed Packet Access (“HSPA+”) and EV-DO and EV-DO Rev. A. As noted above, these technologies can result in download speeds of up to around 21 Mbps. Over the next several years, carriers will deploy 4G technologies with downlink speeds of 100 Mbps. Because smart grid standards have only been recently announced and the utility industry still is evaluating first generation smart grid products,¹¹⁷ CMRS networks will be significantly robust once next generation smart grid products are developed.

The U.S. wireless industry has been at the forefront of the movement to bring smart grids to reality. First, wireless carriers have developed new, innovative pricing plans for smart grid deployments utilizing CMRS networks.¹¹⁸ These new plans make it more economical to utilize commercial wireless networks for smart grid applications.

¹¹⁷ See Katherine Ling, *Obama Admin Releases Initial 'Smart Grid' Standards* (Sept. 24, 2009), available at <http://www.nytimes.com/gwire/2009/09/24/24greenwire-obama-admin-releases-initial-smart-grid-standards-98180.html> (last visited Sept. 29, 2009).

¹¹⁸ See Fierce Wireless, *AT&T To Offer Wireless Smart Grid Technology To Utility Companies* (March 2009), available at <http://www.fiercewireless.com/press-releases/t-offer-wireless-smart-grid-technology-utility-companies-0> (last visited Sept. 29, 2009).

Second, many wireless carriers have forged partnerships or developed innovative products to facilitate smart grid development and deployment. T-Mobile, for example, developed a SIM card specifically designed for M2M applications. The M2M SIM is much smaller than traditional SIM cards – it is only about the size of a pin head – and is designed to withstand harsh weather conditions where M2M devices may be deployed.¹¹⁹ T-Mobile also entered into a strategic alliance with Echelon, a smart meter provider, whereby T-Mobile’s M2M SIM card will be built into Echelon products and data from the smart meters will be transported over T-Mobile’s wireless network.¹²⁰

AT&T entered into a similar arrangement with SmartSynch, a smart meter maker that has smart grid solutions already deployed at more than 100 utilities in North America,¹²¹ whereby data from SmartSynch’s meters are carried over the AT&T wireless network.¹²² AT&T also reached an arrangement with Cooper Power Systems (“CPS”) whereby data from CPS’s outage monitors and voltage sensors will be transmitted wirelessly via AT&T’s network.¹²³

Verizon Wireless entered into agreements with Ambient and Itron, two companies that provide utilities with solutions for creating smart grid communication platforms and technologies.

¹¹⁹ See Marguerite Reardon, *T-Mobile goes for smart grids* (Apr. 23, 2009), available at http://news.cnet.com/8301-1035_3-10226418-94.html (last visited Sept. 29, 2009).

¹²⁰ See Ariel Schwartz, *T-Mobile Joins the Smart-Grid Wireless Network Brigade* (May 5, 2009), available at <http://www.fastcompany.com/blog/ariel-schwartz/sustainability/t-mobile-joins-smart-grid-wireless-network-brigade> (last visited Sept. 29, 2009).

¹²¹ See Fierce Wireless, *AT&T To Offer Wireless Smart Grid Technology To Utility Companies* (March 2009), available at <http://www.fiercewireless.com/press-releases/t-offer-wireless-smart-grid-technology-utility-companies-0> (last visited Sept. 29, 2009).

¹²² See Katie Fehrenbacher, *Phone Companies Heart Smart Grid: SmartSynch, AT&T Sign Up Texas Utility* (Apr. 16, 2009), available at <http://earth2tech.com/2009/04/16/phone-companies-heart-smart-grid-smartsynch-att-sign-up-texas-utility> (last visited Sept. 29, 2009). Texas-New Mexico Power has already agreed to utilize this solution for 10,000 smart meters in Texas. *Id.*

¹²³ See Press Release, AT&T, *AT&T and Cooper Power Systems to Offer Wireless Smart Grid Sensors* (June 24, 2009), available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26874> (“AT&T/Cooper Press Release”); Jeff St. John, *AT&T Links Cooper Power Systems’ Smart Grid Devices* (June 25, 2009), available at <http://www.greentechmedia.com/articles/read/att-links-cooper-power-systems-smart-grid-devices> (last visited Sept. 29, 2009). Under the CPS agreement, AT&T will co-sell the outage monitors and voltage sensors. AT&T/Cooper Press Release at 1.

Under these agreements, which are intended to facilitate the deployment of smart grid projects across the country, Verizon Wireless will carry the traffic from Ambient's Smart Grid platform and Itron's mesh networks that connect smart meters.¹²⁴

Leap Wireless recently announced that it was sponsoring a new start-up incubator for companies and entrepreneurs in communications and communications convergence, with a particular focus on wireless smart grids.¹²⁵ Sprint Nextel and Clearwire also have announced that they plan to support smart grid deployments as well.¹²⁶

Finally, mobile virtual network operators ("MVNOs") have been established primarily to serve the M2M market.¹²⁷ For example, KORE Telematics – a specialized MVNO providing M2M wireless service – serves more than 550 application providers powering diverse applications (including utility metering) over the AT&T wireless network.¹²⁸ Similarly, CrossBridge Solutions is another MVNO that offers wireless utility metering services that can power smart grid applications. CrossBridge Solutions utilizes a variety of CMRS services to serve client needs, including Sprint's CDMA/1xRTT/EV-DO wireless network and AT&T's GPRS/EDGE wireless network.¹²⁹

¹²⁴ See Transmission & Distribution World, *Verizon Wireless and Ambient Join to Offer Smart Grid Communications System* (Mar. 25, 2009), available at http://tdworld.com/info_systems/vendor_updates/verizon-ambient-smart-grid-0309 (last visited Sept. 29, 2009); Jeff St. John, *Verizon, Itron Hook Up Smart Grid Communications* (Apr. 1, 2009), available at <http://www.greentechmedia.com/green-light/post/verizon-itron-hook-up-smart-grid-communications-1315> (last visited Sept. 29, 2009).

¹²⁵ See Press Release, CommNexus San Diego, *San Diego Wireless Heavyweight Leap Wireless Supports New Start-up Incubator* (June 17, 2009), available at http://news.prnewswire.com/DisplayReleaseContent.aspx?ACCT=ind_focus.story&STORY=/www/story/06-17-2009/0005045873&EDATE=.

¹²⁶ See Julie Blin, *Smart grids: The next wireless goldmine?* (May 15, 2009), available at <http://www.fiercebroadbandwireless.com/story/smart-grids-next-wireless-goldmine/2009-05-15> (last visited Sept. 29, 2009).

¹²⁷ *Id.* (referencing MVNOs Kore Telematics and CrossBridge Solutions).

¹²⁸ See KORE Telematics, *About KORE*, available at <http://www.koretelematics.com/en/corporate/index.html> (last visited Sept. 30, 2009).

¹²⁹ See CrossBridge Solutions, *Welcome to CrossBridge Solutions*, available at <http://www.crossbridgesolutions.com> (last visited Sept. 29, 2009).

3. Facilitating mLearning

CTIA member companies also have taken steps to develop new innovative applications designed to encourage mobile learning (“mLearning”). AT&T, for example, certified a mobile learning application in August 2008 that was designed to heighten the classroom experience and enhance learning at colleges and universities. The application, a Web-based solution that can be enabled using an AT&T smartphone, creates interactive student response systems that allow educators to go beyond traditional teaching methods. The application allows real-time student polling and offers in-depth analysis of responses. The solution can work within a traditional classroom environment or remotely for distance learning.¹³⁰

AT&T also started a “Big Mobile on Campus” contest in 2008, which rewards college students that develop applications for mobile learning. The 2008 winning team developed the iStanford application that allows Stanford students with iPhones “to add and drop courses, plan schedules around a particular major or minor, view bills, search the school directory and campus map and get up-to-the-minute scores and news updates for varsity athletics.”¹³¹ Consistent with the Big Mobile on Campus initiative, AT&T supported another university’s mLearning initiative, where every freshman received an iPhone or iPod touch for use with mLearning applications.¹³²

¹³⁰ See Press Release, AT&T, AT&T to Deliver Mobile Student Response Solution, Enhancing Higher Education Classroom Experience Web-Based Application Certified by AT&T, Enabling Real-Time Polling and Distance-Learning Interaction Using Mobile Devices (Aug. 26, 2008), *available at* <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26035>. The application operates over AT&T’s 3G and EDGE networks. *Id.*

¹³¹ Dan Butcher, *AT&T announces winners for 2008 Big Mobile On Campus Challenge* (Oct. 28, 2008), *available at* <http://www.mobilemarketer.com/cms/news/carrier-networks/1992.html> (last visited Sept. 29, 2009). The current contest ends on October 15, 2009.

¹³² See Abilene Christian University News & Events, *Mobile learning enhances student and faculty experience at ACU*, *available at* http://www.acu.edu/news/2008/080815_mLearning_Lau.html (last visited Sept. 29, 2009); Press Release, Reuters, ACU’s Innovation Attracts Global Attention; Hundred Coverage on Campus to Explore Mobile Learning (Jan. 28, 2009), *available at* <http://www.reuters.com/article/pressRelease/idUS230336+28-Jan-2009+BW20090128> (last visited Sept. 29, 2009).

Verizon Wireless also works with various mLearning initiatives. In 2005, it supported the efforts of Kent State University's Digital Videoconferencing Project that was investigating the use of video cell phones to bring community resources into the classroom in 2005.¹³³ Verizon Wireless partnered with Mobile-Mind to launch Mobile-Mind's ASL (American Sign Language) Fingerspelling application on Verizon Wireless Get It NowSM-enabled phones.¹³⁴ This application presents the 26 letters of the American Sign Language alphabet as a one-time application download. Customers then can study and quiz themselves on the Fingerspelling alphabet using high-contrast, easy-to-see images right on their phone.¹³⁵ Verizon also supports the Chesapeake Bay Field Scope, which allows students to upload their own field data regarding the Chesapeake Bay – including water quality measurements, field notes, and media, such as photos – and to see it in relation to data from peers and professional scientists.¹³⁶

4. Other M2M Innovations

There are a multitude of M2M examples already in the marketplace. The following provides a small sample of the innovative devices currently available.

Personal Security. The Higher Education Opportunity Act of 2008 states that higher education institutions must have procedures to “immediately notify the campus community upon the confirmation of a significant emergency or dangerous situation involving an immediate threat to the health or safety of students or staff occurring on the campus.”¹³⁷ T-Mobile and Sprint Nextel

¹³³ See Thomas McNeal and Mark van't Hooft, *Anywhere, anytime: Using mobile phones for learning* (Winter 2006), available at <http://www.rcetj.org/?type=art&id=79575> (last visited Sept. 29, 2009).

¹³⁴ See Press Release, Verizon Wireless, Verizon Wireless Customers Can Learn the American Sign Language Alphabet With Mobile-Mind's ASL Fingerspelling on Get It Now (June 12, 2003), available at <http://news.vzw.com/news/2003/06/pr2003-06-12.html>.

¹³⁵ See *id.*

¹³⁶ See National Geographic, *Chesapeake Bay FieldScope*, available at <http://www.nationalgeographic.com/field/projects/cbfieldscope.html> (last visited Sept. 29, 2009).

¹³⁷ Pub. L. No. 110-315.

have partnered with Rave Wireless to transform students' mobile phones into personal safety devices.¹³⁸ The phone-accessed application can be armed, and when triggered, automatically sends the user's picture, mobile number and personal information to campus police.

Smart Logistics. Another innovative use of M2M is smart logistics – the use of M2M technology to monitor and track commercial vehicles to improve efficiency. M2M devices can be used to optimize the routing of commercial vehicles to minimize the impact of traffic disruptions or to coordinate the arrival of two vehicles at the same location at the same time – to exchange merchandise, for example. These M2M devices could be programmed to interact automatically with smart traffic and alert systems that may be deployed in the future.¹³⁹

M2M devices also can be deployed in vending machines to send out inventory information to suppliers.¹⁴⁰ This information will allow suppliers to stock delivery vehicles with the proper mix of products to re-fill the vending machines by eliminating the guesswork regarding which products may require replenishment. Accenture's Carbon Connections report states that smart logistics could reduce carbon emissions in EU member countries by more than 35 metric tons per year in CO₂e and cut energy costs by more than £13 billion by 2020.¹⁴¹

Smart Manufacturing. M2M devices also are being developed to achieve improvements in manufacturing efficiency. According to the Accenture Report, the use of M2M devices to schedule predictive maintenance of critical machinery represents a significant opportunity to reduce carbon

¹³⁸ See Press Release, Sprint, *Sprint and Rave Wireless Once Again Partner to Make Campuses More Secure* (May 7, 2007), available at http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_Print&ID=996420&highlight=; see also Press Release, Rave Mobile Safety, *Rave Wireless Enhances Campus Safety Solution Using T-Mobile's Nationwide Network* (Oct. 30, 2008), available at <http://www.ravewireless.com/news/10/30/2008>.

¹³⁹ Carbon Connections at 5, 21-27.

¹⁴⁰ *Id.* at 21, 24.

¹⁴¹ *Id.* at 21.

emissions.¹⁴² For example, wireless technology could be used to allow real-time M2M connectivity to measurements from manufacturing processes. The Report notes that most high-value manufacturing equipment already has built-in computers to monitor operational status and “it would be relatively easy to integrate a cellular M2M communications module into these devices to transmit data securely to maintenance providers, enabling them to monitor machinery remotely and prevent unnecessary trips.”¹⁴³ In this regard, Verizon Wireless and Qualcomm recently formed a joint venture to deliver M2M wireless services, including smart manufacturing services.¹⁴⁴ The companies said the joint venture will be a one-stop shop that will automate wireless devices and offer provisioning, specialized applications and wireless network connectivity for firms to implement M2M services.¹⁴⁵

It is estimated that use of M2M technology in this manner could reduce carbon emissions in EU member countries by almost two metric tons per year in CO₂e and cut fuel costs by more than £800 million by 2020.¹⁴⁶

5. Innovative “Green” Wireless Technologies

During his speech at the CTIA WIRELESS 2009[®] conference in April, former U.S. Vice President Al Gore stated that “[w]ireless is going to be one of the key tools that we use to solve the climate crisis.”¹⁴⁷ In addition to the smart initiatives referenced above that could significantly

¹⁴² *Id.* at 28

¹⁴³ *Id.*

¹⁴⁴ See Phil Goldstein, *Verizon, Qualcomm forming M2M joint venture* (July 28, 2009), available at http://www.fiercewireless.com/story/verizon-qualcomm-forming-m2m-joint-venture/2009-07-28?utm_medium=rss&utm_source=rss&cmp-id=OTC-RSS-FW0#ixzz0S4DJ3mWT (last visited Sept. 29, 2009).

¹⁴⁵ See *id.*

¹⁴⁶ Carbon Connections at 21.

¹⁴⁷ See Sam Bookman, *CTIA 2009: Gore sees hope for environment in wireless* (Apr. 3, 2009), available at http://www.telecommagazine.com/newsglobe/article.asp?HH_ID=AR_5088 (last visited Sept. 29, 2009).

reduce carbon emissions or improve energy efficiency, additional efforts have been undertaken by wireless carriers to address environmental concerns.¹⁴⁸

Sprint Nextel, for example, has been a pioneer with regard to green initiatives in the wireless industry. Sprint Nextel has deployed more than 250 hydrogen fuel cells at sites throughout its network to provide “clean” backup power in the case of an emergency. It recently received a \$7.3 million grant from the U.S. Department of Energy to improve fuel cell technology and increase the use of such technology across the Sprint Nextel network.¹⁴⁹ Sprint Nextel also was the first major U.S. wireless carrier to offer a solar-powered cell phone charger to reduce reliance on fossil fuels. In addition, Sprint Nextel announced that it wants to achieve a 90 percent recycling rate for mobile phones and recently announced the availability of the Samsung Reclaim™, the first phone in the U.S. made from eco-friendly bio-plastic materials.¹⁵⁰

Earlier this year, T-Mobile began offering its own eco-conscious phone. The Motorola “Renew” is a 850/1900MHz GSM/GPRS bar phone with a housing made from recycled plastic water bottles. In addition, the phone packaging and included in-box materials (reduced by 22 percent) are printed on 100 percent post-consumer recycled paper, and even include a prepaid shipping envelope for mailing the previously-owned phone for recycling.¹⁵¹ For its part, Motorola

¹⁴⁸ See *Innovation NOI* at ¶ 54.

¹⁴⁹ See Press Release, Sprint, Sprint Supports Utility Smart Grid Initiatives across America (Aug. 11, 2009), available at <http://investors.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle&ID=1319624&highlight=> (last visited Sept. 29, 2009).

¹⁵⁰ *Id.*

¹⁵¹ See Motorola Renew, available at <http://www.t-mobile.com/shop/phones/Cell-Phone-Detail.aspx?cell-phone=Motorola-Renew> (last visited Sept. 30, 2009); Joseph Palenchar, T-Mobile Phone Goes Green, *Twice*, (Feb 4, 2009), available at http://www.twice.com/article/247919-T_Mobile_Phone_Goes_Green.php (last visited Sept. 30, 2009).

partnered with Carbonfund.org to offset the carbon dioxide required to manufacture, distribute and operate the phone. Motorola called the Renew the first carbon-neutral mobile phone.¹⁵²

Wireless device maker Nokia has taken to heart its charge to ensure environmental sustainability at all stages of product lifecycles, ranging from the selection of materials used, energy consumption, and recycling. Nokia also introduced the “Remade” phone, made from recycled soda cans, drink bottles and car tires.¹⁵³ The phone’s user interface is optimized for low-power and high-contrast black-and-white graphics, while color display can be activated. Moreover, device’s inner workings utilize printed electronic components on non-toxic substrates and improved chip-level efficiencies.

These types of practices squarely address environmental concerns for the benefit of the public generally and reflect the innovation that is occurring in the mobile ecosystem on a daily basis.¹⁵⁴

D. Innovation And Investment In The Wireless Market Have Resulted In Demonstrable Economic Growth And Consumer Welfare Advances

As demonstrated above, innovation and investment in the mobile wireless ecosystem has resulted in clear public interest benefits. Much of this success can be attributed to the bedrock “light regulatory policy” decisions formulated in bipartisan fashion under the leadership of then-President Bill Clinton and Vice President Al Gore, which have made the mobile wireless ecosystem the highly-innovative, rapidly-growing, and widely-accessible sector that it is today. Given the Federal assistance that has been required to stabilize other sectors such as the auto and

¹⁵² Joseph Palenchar, T-Mobile Phone Goes Green, Twice, (Feb 4, 2009), *available at* http://www.twice.com/article/247919-T_Mobile_Phone_Goes_Green.php (last visited Sept. 30, 2009).

¹⁵³ See Ali Kriscenski, *Nokia Remade Concept Phone Made from Recycled Materials* (Feb. 18, 2008), *available at* <http://www.inhabitat.com/2008/02/18/nokia-remade-concept-phone-made-from-recycled-materials/> (last visited Sept. 30, 2009).

¹⁵⁴ See *Innovation NOI* at ¶ 54.

financial industries, it is encouraging to see the robust performance of the wireless industry in the environment that Congress and the Commission have fostered for wireless services.

As demonstrated above, the mobile wireless industry has had, and will continue to have, a profound impact on the way consumers live their lives. Not only is the industry providing critical voice, data and video connections, it now has turned to working on creative services and applications to improve the lives of Americans in a number of important societal areas including healthcare, education, and energy and environmental conservation. CTIA also sees the explosive growth in mobile social networking applications. One analyst reports that the number of unique visitors to the Facebook mobile site increased fivefold from five million per month in January 2008 to 25 million in February 2009 – 18 percent of Facebook’s user community.¹⁵⁵ Loopt, a mobile application that lets users broadcast their location to friends, is reported to have “millions” of users across the country.¹⁵⁶

As the Commission looks at “what metrics are most appropriate to develop a possible framework for evaluation of innovation and investment,”¹⁵⁷ CTIA offers the following observation: the virtuous cycle can be quantified by key metrics and observations that chart the evolution of the mobile wireless ecosystem, through data points such as increased wireless use and differentiated services (Table 9 and Figures 2 and 15), deployment of advanced handsets (Figure 18), application growth (Table 21) and efficient use of spectrum (Figure 14). These metrics, when taken together, highlight the innovation and investment that has occurred over time in the mobile wireless ecosystem and quantify many of the different segments that make up the virtuous cycle. If the

¹⁵⁵ See ReportLinker, *Mobile Social Networking and User Generated Content Market Insight 2009-2014* (May 2009), available at http://www.reportlinker.com/p0148919/Mobile-Social-Networking-and-User-Generated-Content-Market-Insight-2009-2014.html?utm_source=LivePR&utm_medium=pr&utm_campaign=LivePR (last visited Sept. 29, 2009).

¹⁵⁶ See Scott Duke Harris, *Loopt shows iPhone a new trick* (Sept. 8, 2009) available at http://www.mercurynews.com/breaking-news/ci_13272356 (last visited Sept 29, 2009).

¹⁵⁷ *Innovation NOI* at ¶ 10.

Commission sees continued growth in each of these areas, as has historically been the case, the numbers can tell us a great deal about the continued state of innovation and investment in the wireless marketplace.

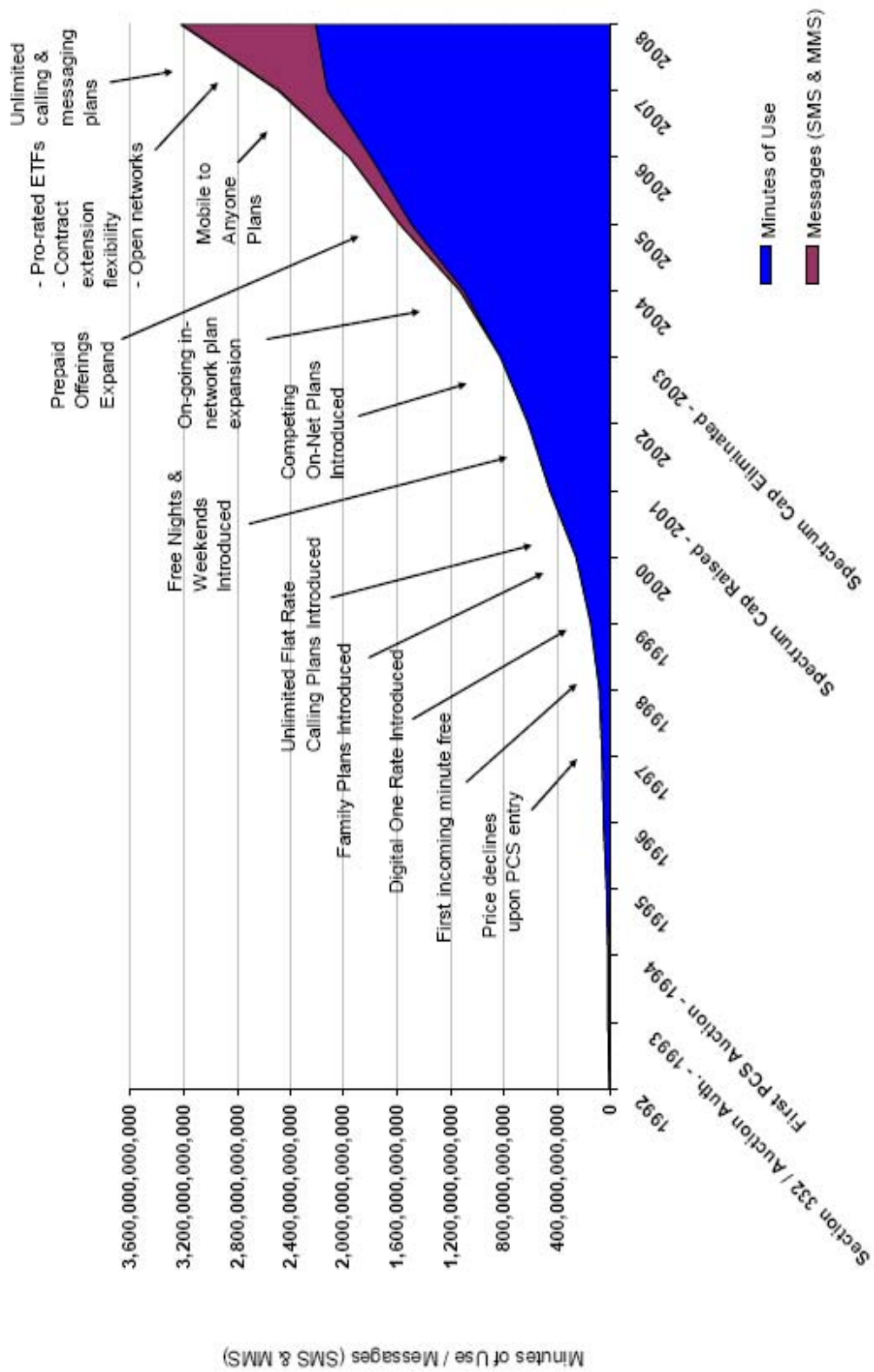
Finally, the most important metrics the Commission should consider are the availability of spectrum and the standing of exclusive-use, flexible rights licensing. As discussed in more detail below, if the Commission wants to continue the virtuous cycle of innovation and investment in the mobile wireless ecosystem, it should immediately take the necessary steps to identify additional spectrum for exclusive-use licensing.

II. U.S. WIRELESS SERVICE PROVIDERS ARE DRIVING NOT ONLY "TECHNICAL" INNOVATION, BUT ALSO INNOVATION IN THE PROVISION OF SERVICE

A. In The Last Decade, Competition Has Driven Service Providers To Consistently Innovate In The Provision Of Service

Innovation has been the hallmark of wireless service and pricing plans over the past decade.¹⁵⁸ The creativity of pricing plans includes: free first minute; bucket plans; family plans; unlimited flat rate calling; free nights and weekends; on-net calling; prepay; rollover minutes; mobile to anyone; and unlimited calling and data plans. This is the sign of a competitive and innovative industry – service providers responding to consumer needs and wants in a variety of ways.

¹⁵⁸ See *Innovation NOI* at ¶ 63 (“To what extent have wireless companies adopted innovations in business practices in response to competition or to better accommodate consumer needs or expectations?”).



Source: CTIA Research
Figure 22. A Timeline of Plan and Pricing Innovation

The Commission historically has allowed “competitive market forces to govern rate and rate structures for wireless services,” and the wireless industry has a long history of innovation in pricing and service plans.¹⁵⁹ In May 1998, for example, AT&T Wireless revolutionized wireless pricing with the introduction of its Digital One Rate plan,¹⁶⁰ which allowed customers to purchase a bucket of minutes to use on a nationwide basis for a single flat rate, without any roaming and long-distance charges.¹⁶¹ Other wireless carriers moved quickly to respond to this new pricing strategy, and today many wireless carriers offer similar plans.¹⁶²

As the all-inclusive bucket of minutes plans took hold, new innovative offerings were necessary to gain a competitive advantage. Thus, by 2003, new “family plans” were being offered that permitted subscribers to sign up for multiple lines, with all lines sharing the available minutes on the plan jointly.¹⁶³ Due to the popularity of these plans, many wireless carriers now offer such pricing packages.¹⁶⁴

¹⁵⁹ See *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers*, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd. 15817, ¶ 35 (2007).

¹⁶⁰ *Twelfth CMRS Competition Report*, 23 FCC Rcd. at 2291-92.

¹⁶¹ See Press Release, AT&T, *AT&T Wireless Is Separate, Independently-Traded Company Following Split-off From AT&T* (July 9, 2001), available at <http://www.corp.att.com/news/2001/07/09-3904> (last visited Sept. 28, 2009); Press Release, AT&T, *AT&T Launches First National One-Rate Wireless Service Plan* (May 7, 1998), available at <http://www.allbusiness.com/media-telecommunications/telecommunications/6876757-1.html>; see also *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Eleventh Report, 21 FCC Rcd. at 10947, 10983 (2006) (“*Eleventh CMRS Competition Report*”).

¹⁶² See *Eleventh CMRS Competition Report*, 21 FCC Rcd at 10983; see also <http://www.uscc.com/uscellular/SilverStream/Pages/uscellular.html> (last visited Sept. 29, 2009).

¹⁶³ See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Tenth Report, 20 FCC Rcd. at 15908, 15946 (2005) (“*Tenth CMRS Competition Report*”) (citing *Family Plans Reflect Slowing Cell Growth*, Reuters, Mar. 27, 2005).

¹⁶⁴ *Id.* See also, e.g., Cellular South, *Family Plans*, available at https://www.cellularsouth.com/cscommerce/products/plans/category_plan_list_family.jsp?id=cat320003 (list of Cellular South family plans) (last visited Sept. 29, 2009).

A number of mobile wireless providers also developed service plans designed to compete directly with wireline local telephone service.¹⁶⁵ The plans offer subscribers the ability to make unlimited calls within a particular metropolitan area or region. Leap, under its “Cricket” brand, and MetroPCS offer such service plans on a pre-pay basis.¹⁶⁶

More recently, in February 2008, Verizon Wireless began offering an unlimited nationwide flat-rate calling plan for voice services.¹⁶⁷ AT&T and T-Mobile soon began offering similar plans.¹⁶⁸ Later the same month, Sprint announced its “Simply Everything” plan that permitted unlimited voice *and* data use from phones operating over its CDMA and iDEN networks for \$99.99 per month.¹⁶⁹ In February 2009, Sprint introduced a variant of this plan that included 5 GB of Internet access from laptops for \$149.99 per month.¹⁷⁰ Later, Sprint announced a \$70 “Everything Data With Any Mobile Anytime” Plan, which provides Sprint’s unlimited data service and unlimited mobile to mobile wireless calling.¹⁷¹ Sprint’s unlimited service includes voice, data, text, e-mail, GPS navigation, and sending videos and images from one mobile phone to another, no matter the wireless network.

¹⁶⁵ See *Twelfth CMRS Competition Report*, 23 FCC Rcd at 2342.

¹⁶⁶ *Id.*

¹⁶⁷ “Verizon Wireless Introduces New Unlimited Plans That Are As Worry Free As The Guarantee,” Verizon Wireless Press release (Feb. 19, 2008), available at <http://news.vzw.com/news/2008/02/pr2008-02-19.html>; see also *Thirteenth CMRS Competition Report* at ¶ 112.

¹⁶⁸ See *Thirteenth CMRS Competition Report* at ¶ 112.

¹⁶⁹ See Press Release, Sprint, Sprint Launches Revolutionary \$99.99 “Simply Everything(SM)” Plan (Feb. 28, 2008), available at http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1113525.

¹⁷⁰ See Press Release, Sprint, Sprint Brings Even More Value to Customers with New Simply Everything Plan + Mobile Broadband (Feb. 16, 2009), available at http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1256741&highlight=Sprint%20Brings%20Even%20More%20Value%20to%20Customers%20with%20New%20Simply%20Everything%20Plan%20+%20Mobile%20Broadband.

¹⁷¹ See David Coursey, *Sprint Launches \$70 Unlimited Calling Plan* (Sept. 10, 2009), available at http://www.pcworld.com/businesscenter/article/171738/sprint_launches_70_unlimited_mobile_calling_plan.html (last visited Sept. 29, 2009).

The aforementioned pricing innovations are only examples of the myriad wireless pricing plans that have been developed over the years. The development of such a wide variety of pricing options shows the virtuous cycle of innovation in the mobile wireless ecosystem, particularly in a non-technical area like the provision of customer service plans.

B. In The Last Two Years, Service Providers Have Accelerated The Pace Of Innovation In The Carrier/Customer Relationship

As service providers begin to compete more vigorously in a number of non-traditional elements of the mobile wireless ecosystem, there has been remarkable innovation in the carrier/customer relationship from the point of sale and throughout the life of a customer relationship. The following table highlights the developments among five of the nation's largest wireless carriers. It shows that carriers are providing a host of information and options all designed to attract and retain customers.

U.S. Wireless Carrier Consumer Practices¹⁷²

	ETF policies	Trial period	Point of sale information/ documentation	Online, street-level coverage maps	Ability to change plan w/o contract extension	Ability to purchase service w/o a contract (prepaid)	Ability to bring your own phone	Ability to pay full price for a handset and take service w/o a contract
AT&T	Prorates new and renewed 1 & 2 year consumer contracts. Fees decline by \$5 each completed month of the contract.	30-day	Follows CTIA Consumer Code	Yes	Yes	Yes	Yes	Yes
Sprint Nextel	Prorates new and renewed 1 & 2 year consumer contracts. Fees decline by \$10 per month, beginning with the 5th month of the contract until reaching \$50 for the remaining 5 months of the contract.	30-day	Follows CTIA Consumer Code	Yes	Yes	Yes	Yes	Yes

¹⁷² See CTIA August 14, 2009, *Ex Parte* at Attachment: U.S. Wireless Carrier Consumer Practices.

	ETF policies	Trial period	Point of sale information/documentation	Online, street-level coverage maps	Ability to change plan w/o contract extension	Ability to purchase service w/o a contract (prepaid)	Ability to bring your own phone	Ability to pay full price for a handset and take service w/o a contract
T-Mobile USA	Prorates new and renewed 1 and 2 year consumer contracts. \$100 with < 180 days left, \$50 with < 90 days left, and the lesser of \$50 or the customers' standard monthly charge with < 30 days left	14-day (30 days in CA)	Follows CTIA Consumer Code	Yes	Yes	Yes	Yes	Yes
U.S. Cellular	Starting in the 5 th month, the ETF will be reduced by \$7.50/month (24 month contract) or \$18.50/month (12 month contract)	30-day	Follows CTIA Consumer Code	No, State-level only	Yes	Yes	Yes	Yes
Verizon Wireless	Prorates new and renewed contracts Fees decline by \$5 per month	30-day	Follows CTIA Consumer Code	Yes	Yes	Yes	Yes	Yes

Information Current as of June 3, 2009

Figure 23. U.S. Wireless Carrier Consumers Practices

The chart above demonstrates that the competitive marketplace is delivering innovation into carrier offerings – all to the benefit of U.S. customers.

Nonetheless, CTIA notes that state and local taxes levied exclusively on wireless providers and their consumers impose a significant burden on investment and innovation in the wireless sector. Consumers of wireless services pay, on average, a combined rate of 15% in federal, state and local taxes, a figure far in excess of the rates imposed on other competitive goods and services.¹⁷³ These excessive tax rates in turn impose a drag on investment in wireless broadband deployment, a result that directly undermines the goal of advancing broadband nationwide. These discriminatory taxes have caught the attention of Congress – the “Cell Tax Fairness Act of 2009”

¹⁷³ See Scott Mackey, *Excessive Taxes and Fees on Wireless Service: Recent Trends*, Tax Analysts, Feb. 18, 2008, at 519, 522, available at http://files.ctia.org/pdf/MackeyExcessiveTaxesFeesWireless_2_18_08.pdf (last visited Sept. 30, 2009).

(H.R. 1521), was recently introduced in the U.S. House of Representatives, and a companion bill, the "Mobile Wireless Tax Fairness Act of 2009 (S.1192)", was introduced in the Senate. If enacted, these bills would impose a five-year moratorium on the imposition of new discriminatory taxes and fees on wireless carriers and their consumers, while the industry continues to work with state and local governments to reform their existing tax regimes to reflect a tax environment that is similar to the taxes imposed on other general goods and services. Reducing the excessive tax burden imposed upon the wireless industry and its consumers would enable wireless carriers to pour more money into investment and innovation, which in turn will directly benefit consumers and our nation's economy. Accordingly, CTIA urges the Commission to encourage Congress to pass this legislation.

III. THE U.S. WIRELESS ECOSYSTEM IS LEADING THE WORLD IN INNOVATION

A. At The Core Of U.S. Innovation Is The Leadership Role That U.S. Carriers Have Played In Deploying Next Generation Networks

U.S. wireless service providers operate some of the most extensive and actively-used 3G wireless data networks in the world. As a result, U.S. data usage is growing exponentially. The virtuous cycle has led to the rapid proliferation of smartphones, netbooks, and other 3G-capable devices along with a multitude of applications.¹⁷⁴ All of this innovation, however, is predicated on network architecture upgrades to support enhanced capabilities. Time and again, U.S. wireless carriers have led the way in next generation deployments.

Today, U.S. carriers are among the world leaders in the development and deployment of next generation technologies, including 4G networks. Verizon Wireless, for example, is relying on LTE, which will permit downloads at peak rates of at least 100 Mbps with low latency. The company has already demonstrated an operational trial LTE network in Boston, Seattle and Basking

¹⁷⁴ See, e.g., Chetan Sharma Consulting, *Managing Growth and Profits in the Yottabyte Era*, at 8-11 (2009), available at <http://www.chetansharma.com/yottabyteera.htm>.

Ridge.¹⁷⁵ It also has announced plans to turn on service in 25 to 30 markets covering a population of 100 million in 2010 and cover its entire 3G footprint by 2013.¹⁷⁶ The company is actively developing an ecosystem of LTE support by working with developers at early stages to assist in development of innovative devices and applications and is working with companies from several countries to promote cross-platform compatibility.¹⁷⁷ Other U.S. wireless companies are making aggressive 4G deployment plans – for example, fifth-largest network operator MetroPCS expects to deploy LTE in mid-2010, shortly after Verizon Wireless.¹⁷⁸

AT&T is enhancing the capabilities of its 3G systems in the short term by rolling out HSPA to about 90 percent of its systems by 2011, and it will be starting LTE trials in 2010 and commercial service in 2011.¹⁷⁹ AT&T expects to provide LTE service covering 87 percent of the nation's population.¹⁸⁰ The company had initially planned to deploy further 3G speed enhancements

¹⁷⁵ Verizon Wireless Press Release, Verizon Selects LTE as 4G Wireless Broadband Direction (Nov. 29, 2007), available at <http://news.vzw.com/news/2007/11/pr2007-11-29.html>.

¹⁷⁶ See W. David Gardner, InformationWeek, *Verizon Wireless Plans Mass LTE Deployment* (Sept. 24, 2009), available at <http://www.informationweek.com/news/mobility/business/showArticle.jhtml?articleID=220200106> (last visited Sept. 29, 2009); see also Phil Goldstein, FierceWireless, *Verizon's Melone details 4G plans for backhaul, antennas, and backup power* (Sept. 22, 2009), available at <http://www.fiercewireless.com/story/verizons-melone-stresses-collaboration-4g/2009-09-22> (last visited Sept. 29, 2009); see also James Middleton, Telecoms.com, *LTE interest gathering steam* (Sept. 21, 2009), available at <http://www.telecoms.com/14695/lte-interest-gathering-steam> (last visited Sept. 29, 2009).

¹⁷⁷ See Raja Singh Chaudhary, TMCnet, *4G Wireless Evolution — Verizon Wireless Unveils 4G Wireless Evolution Plans* (Sept. 28, 2009), available at <http://4g-wirelessevolution.tmcnet.com/topics/4g-wirelessevolution/articles/65279-verizon-wireless-unveils-4g-wireless-evolution-plans.htm> (last visited Sept. 29, 2009).

¹⁷⁸ See Victor Godinez, Dallas Morning News, *MetroPCS Taps Samsung, Ericsson for network* (Sept. 16, 2009), available at <http://www.dallasnews.com/sharedcontent/dws/bus/industries/techtelecom/stories/091609dnbusmetropcs.1861a9b69.html> (last visited Sept. 29, 2009); Elizabeth Woyke, Forbes, *Metro PCS, ZTE Working On LTE Phones* (Apr. 27, 2009), available at <http://www.forbes.com/2009/04/27/metro-pcs-zte-technology-wireless-metro-pcs.html> (last visited Sept. 29, 2009).

¹⁷⁹ See Roy Furchgott, *AT&T to Speed Its Network in 6 Cities by Year-End* (Sept. 10, 2009) available at <http://www.nytimes.com/2009/09/10/technology/companies/10phone.html> (last visited Sept. 29, 2009); Kevin Fitchard, Telephony Online, *A blow to HSPA+?* (Sept. 22, 2009), available at <http://telephonyonline.com/3g4g/commentary/att-hspa-0922/> (last visited Sept. 29, 2009).

¹⁸⁰ See Andrew Berg, Wireless Week, *Rinne: AT&T Ready for 4G Jump* (Sept. 15, 2009), available at <http://www.wirelessweek.com/News/2009/09/Rinne--AT-T-Ready-for-4G-Jump/> (last visited Sept. 29, 2009).

(HSPA+) but has recently decided to accelerate its LTE network development instead because of the rapid pace of wireless data growth.¹⁸¹

Clearwire's 4G WiMAX network is now available in 14 markets, after launching 10 markets this past September 1.¹⁸² The company plans to bring its branded WiMAX service CLEAR to 80 markets covering up to 120 million people by the end of 2010. Clearwire operates an open all-IP network to deliver next generation broadband access, and its strategic investors include Intel Capital, Comcast, Sprint, Google, Time Warner Cable, and Bright House Networks.

In addition, T-Mobile plans to expand its 3G network to reach a potential 200 million wireless users by the end of 2009.¹⁸³ U.S. Cellular's EV-DO network upgrade will reach 60% of its cell sites by the end of 2009, covering about 75% of its post-paid subscribers.¹⁸⁴ Stelera Wireless is planning to bring HSPA-enabled services to 55 cities by the end of 2009.¹⁸⁵

Meanwhile, foreign carriers are following the lead of U.S. wireless providers and plan to deploy 4G in the coming years, though slightly after U.S. service providers. Bell Canada and Telus plan to jointly deploy a 4G network using LTE in 2012.¹⁸⁶ Chinese carriers are expected to begin

¹⁸¹ See Lynnette Luna, FierceWireless, *Will T-Mobile USA become the dark horse mobile broadband leader?* (Sept. 20, 2009), available at <http://www.fiercewireless.com/story/will-t-mobile-usa-be-dark-horse-mobile-broadband-leader/2009-09-21> (last visited Sept. 29, 2009) (discussing AT&T's announcement that it will more aggressively move to LTE).

¹⁸² Press Release, Clearwire, Clearwire to Officially Launch CLEAR 4G Service in 10 Markets on September 1, 2009 (Aug. 3, 2009), available at <http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1315679&highlight=> (last visited Sept. 29, 2009).

¹⁸³ See Sinead Carew, *T-Mobile USA unveils high-speed plans, new device*, REUTERS, Mar. 25, 2009, available at <http://www.reuters.com/article/ousivMolt/idUSTRE52O0WV20090325> (last visited Sept. 29, 2009).

¹⁸⁴ See Sarah Reedy, *US Cellular accelerates EV-DO push, weighing LTE trial*, TELEPHONY ONLINE, May 6, 2009, at <http://telephonyonline.com/wireless/news/us-cellular-evdo-upgrade-0506> (last visited Sept. 29, 2009)/.

¹⁸⁵ *Stelera Selects Ceragon IP Solutions to Backhaul Wireless Broadband in Rural America*, PR Newswire, May 4, 2009, available at http://www.breitbart.com/article.php?id=prnw.20090504.UKSU004B&show_article=1 (last visited Sept. 29, 2009).

¹⁸⁶ See Kevin Fitchard, Telephony Online, *Bell Canada, Telus jump on LTE bandwagon* (Oct. 10, 2008), available at <http://telephonyonline.com/global/news/bell-canada-telus-lte-1010/> (last visited Sept. 29, 2009).

building LTE networks in 2011,¹⁸⁷ Japan's KDDI plans to deploy LTE to 90 percent of Japan's population by 2012,¹⁸⁸ and considerable Asian deployment is expected by 2013.¹⁸⁹

B. Companies Manufacturing Handsets Have Looked First To The U.S. To Deploy Their Products

Importantly, the innovation in smartphones is occurring in the U.S. first as a result of our robust marketplace, as described above. And this strategy is having tremendous impact. According to NPD Group, 23 percent of the wireless handsets sold in the U.S. in the fourth quarter of 2008 were smartphones.¹⁹⁰ In the last 18 months, some of the most advanced handsets have been launched in the U.S. including the Apple iPhone 3G,¹⁹¹ Apple iPhone 3GS,¹⁹² HTC's G1,¹⁹³ T-Mobile MyTouch 3G,¹⁹⁴ LG Voyager,¹⁹⁵ four Research in Motion BlackBerry devices (BlackBerry

¹⁸⁷ See Narayan Bhat, TMCnet, *4G Wireless Evolution — LTE Is The Only Route To Explore China's Wireless Market: In-Stat* (July 30, 2009), available at <http://4g-wirelessevolution.tmcnet.com/topics/4g-wirelessevolution/articles/60971-lte-the-only-route-explore-chinas-wireless-market.htm> (last visited Sept. 29, 2009).

¹⁸⁸ See James Middleton, Telecoms.com, *LTE interest gathering steam* (Sept. 21, 2009), available at <http://www.telecoms.com/14695/lte-interest-gathering-steam> (last visited Sept. 29, 2009).

¹⁸⁹ See 3GPP News, *LTE Asia signals success for 3GPP* (Sept. 11, 2009), available at <http://www.3gpp.org/LTE-Asia-signals-success-for-3GPP> (last visited Sept. 29, 2009).

¹⁹⁰ See Press Release, The NPD Group, *THE NPD GROUP: DESPITE RECESSION, U.S. SMARTPHONE MARKET IS GROWING* (March 3, 2009), available at http://www.npd.com/press/releases/press_090303.html.

¹⁹¹ See Press Release, AT&T, *AT&T to Offer iPhone 3G S on June 19* (June 8, 2009), available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26853>.

¹⁹² See Press Release, AT&T, *AT&T to Offer Next-Generation iPhone on Its High-Performance 3G Network* (June 18, 2009), available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26868>.

¹⁹³ See *supra* n. 62.

¹⁹⁴ See Press Release, T-Mobile, http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20090622&title=T-Mobile%20USA%20Unveils%20the%20T-Mobile%20myTouch%203G%20with%20Google%20Featuring%20Personalization%20Front%20and%20Center

¹⁹⁵ See Press Release, Verizon Wireless, *The Hottest Phones Of The Season Have Arrived: Verizon Wireless Introduces The Voyager And Venus By LG* (November 19, 2007) available at <http://news.vzw.com/news/2007/11/pr2007-11-19.html>.

Storm, BlackBerry Bold, BlackBerry Pearl Flip and BlackBerry Curve 8900),¹⁹⁶ Samsung Instinct,¹⁹⁷ and the Palm Pre.¹⁹⁸ The U.S. marketplace is leading the world.

C. Innovation and Investment Across the U.S. Mobile Ecosystem Are Driving U.S. Consumers To Lead The World In Broadband Use

With innovation and investment occurring across the U.S. mobile ecosystem – from service providers upgrading networks, to the availability of 100,000+ applications, and to the development of the world’s most sophisticated devices – it is not surprising that broadband usage in the U.S. is exploding. According to a Nielsen Media study, the U.S. has a higher percentage of consumers actively using mobile Internet capabilities – 15 percent – than any country measured in the survey.¹⁹⁹ Put in terms of total number of users, roughly 40 million American consumers are “active users” of mobile web service – 75 percent more than just two years earlier.²⁰⁰ Additionally, while much has been made of reports on U.S. broadband rankings, when it comes to *mobile* broadband, U.S. consumers lead the way.²⁰¹ U.S. wireless web use ranks first in the world, accounting for 29.3 percent of all mobile web surfing worldwide according to Bango, a firm that tracks statistics for surfing of web sites optimized for mobile users.²⁰² Additionally, mobile

¹⁹⁶ See BlackBerry, *Smartphones*, available at <http://na.blackberry.com/eng/devices/> (last visited Sept. 29, 2009).

¹⁹⁷ See Press Release, Sprint, Samsung Instinct(TM), Exclusively from Sprint, Brings Speed, Simplicity and a Fully Integrated Touch-Screen Experience to Wireless Marketplace (April 1, 2008), available at http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1124417.

¹⁹⁸ See Press Release, Sprint, Sprint to Offer Palm Pre Nationwide on June 6 (May 19, 2009), available at http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1289761.

¹⁹⁹ See Nielsen Mobile at 2, 4.

²⁰⁰ *Id.* at 2.

²⁰¹ “This wireless data boom, while creating many bottlenecks, also spells opportunity for companies big and small. From backhaul service providers to little app developers, the entire mobile ecosystem has been re-energized.” See Om Malik, *U.S. Leading the Global Mobile Data Boom* (Sept. 22, 2009), available at <http://gigaom.com/2009/09/22/us-leading-the-global-mobile-data-boom/> (last visited Sept. 29, 2009).

²⁰² See Sarah Keefe, Bango, *U.S. tops worldwide charts for mobile web browsing and spending* (March 12, 2009) available at <http://news.bango.com/2009/03/12/us-tops-mobile-web-browsing-and-spending-charts/> (last visited Sept. 28, 2009).

wireless broadband is proving to be more rapidly adopted and used in communities that have traditionally trailed in broadband adoption, such as low-income and minority consumers.²⁰³

Significantly, Americans are using some of the most advanced and extensive broadband wireless networks in the world. According to a July 2009 release from the GSM Association (“GMSA”), the U.S. has 32 million HSPA subscribers out of the 131 million worldwide.²⁰⁴ In fact, North America (the U.S., Canada and Mexico) has 7 percent of all GSM subscribers in the world but has 23 percent of all HSPA subscribers in the world. Similarly, according to Informa Telecoms & Media Group’s June 2009 report on World Cellular Information Service, the U.S. has 63.1 million EV-DO subscribers out of 106.78 million worldwide.²⁰⁵ The U.S. has 23 percent of all CDMA subscribers yet has 59 percent of EV-DO subscribers in the world. These statistics clearly highlight the significant level of innovation and investment in the U.S. wireless industry and the continued need for additional spectrum resources to ensure that the virtuous cycle is allowed to continue.

IV. SPECTRUM AVAILABILITY AND EXCLUSIVE-USE, FLEXIBLE RIGHTS LICENSING ARE ESSENTIAL TO CONTINUING THE VIRTUOUS CYCLE OF INNOVATION AND INVESTMENT IN THE MOBILE WIRELESS ECOSYSTEM

The history of the CMRS market demonstrates that granting an entity the right to exclusive, flexible use of a block of spectrum, within specified frequency, spatial, and time boundaries, and ensuring that entity’s use of the spectrum will not be subject to harmful interference, is a tremendously powerful way for the government to encourage innovation and investment.

²⁰³ See John Horrigan, Pew Internet & American Life Project, *Seeding The Cloud: What Mobile Access Means for Usage Patterns and Online Content* (March 5, 2008), available at <http://pewresearch.org/pubs/754/cloud-computing> (last visited Sept. 28, 2009).

²⁰⁴ See Press Release, GSMA, Global Mobile Broadband Connections to Pass 150 million (July 22, 2009), available at <http://www.gsmworld.com/newsroom/press-releases/2009/3494.htm>.

²⁰⁵ See generally Informa Telecoms & Media, available at <http://shop.informatm.com/marlin/30000001001/INDEX?proceed=true&MarEntityId=1252681475091&entHash=10058c78ae1%20+%20hashInfo%20+> (last visited Sept. 28, 2009).

Unlicensed shared use works well for short-distance communications among a limited number of devices – for example, cordless phones, Wi-Fi local networking, and Bluetooth headsets. But the exclusive-use, flexible rights license model works best for creating large-scale mobile networks requiring extensive investment in infrastructure, such as commercial mobile wireless networks.

The licensee of such a spectrum block has the economic incentive to use the spectrum productively, which in turn provides incentives for the licensee to innovate in the technical use of the spectrum (*i.e.*, use the spectrum more intensively and efficiently) and the services provided over the spectrum (*e.g.*, voice, messaging, data, video). As CTIA stated in 2004, “The track record of the CMRS experience underscores that manufacturers and carriers operating in a competitive, spectrum-constrained environment must take every measure that is technically and economically possible to use spectrum efficiently if they hope to be successful in the marketplace.”²⁰⁶ This observation holds even truer today.

Licensing of spectrum on an exclusive-use, flexible rights basis, gives incentives to equipment manufacturers and software providers to develop innovative devices and operating systems that can take advantage of the technologies chosen and support a wide range of services. And, in turn, the licensing of spectrum and development of highly capable devices gives incentives to developers and producers to produce innovative applications and content that consumers will find compelling.

Mobile services have evolved from luxury personal-use services available to only a few to services used by virtually everyone – all because the Commission had the foresight to make spectrum available, repeatedly, for innovative use under the exclusive licensing paradigm. The

²⁰⁶ Comments of CTIA, ET Docket No. 03-65, at 3 (filed July 21, 2004).

Commission should, accordingly, continue to make additional spectrum available for exclusive-licensed, flexible use and ensure the virtuous cycle of innovation and investment.

A. To Maintain The U.S. Leadership Position In Wireless, And To Facilitate This Virtuous Cycle, The Wireless Market Requires Additional Spectrum

1. The Exponential Growth In Demand For Mobile Wireless Network Capacity And, As A Result, Spectrum

The Commission is correct in observing that “innovative wireless services [are] critically dependent on having access to spectrum.”²⁰⁷ More precisely, they are dependent on having access to *additional* spectrum, if innovation is to continue. Mobile services have grown at quite literally an exponential rate over the last several decades. While voice service remains significant, text messaging volumes have repeatedly more than doubled each year, to reach more than 1 trillion messages in 2008. And demand for wireless data service is astounding.

In a paper filed with the Commission on September 29, 2009, Peter Rysavy notes that spectrum is rapidly being consumed by the increasingly bandwidth-intensive content being sought by users:

The convergence of the Internet and mobile computing is accelerating the consumption of licensed spectrum. For example, watching a YouTube video on a mobile phone or wireless enabled laptop consumes almost one hundred times the data bandwidth of a mobile voice call. And whereas a mobile voice call typically consumes 6 – 12 kbps, enhanced high-speed mobile Internet access consumes up to 5 Mbps on today’s deployed networks. Thus, within the next decade, licensing significant amounts of additional spectrum will be imperative if the U.S. wants its mobile operators to continue expanding and upgrading the country’s wireless broadband networks.²⁰⁸

²⁰⁷ *Innovation NOI* at ¶ 20.

²⁰⁸ See Rysavy Consulting, *Mobile Broadband Spectrum Demand*, at 7 (Dec. 2008), available at http://www.rysavy.com/Articles/2008_12_Rysavy_Spectrum_Demand_.pdf

And this demand for mobile video and bandwidth-intensive services is only increasing with increased service and device capabilities. For example, according to YouTube's blog, mobile uploads to YouTube increased 1,700% in the first half of 2009, and increased more than 400% per day in the week following the launch of the iPhone 3GS.

Rysavy reasons that there are several factors with a multiplicative effect on the need for spectrum, many of which are the direct result of innovation in the past:

- **Critical Mass** – The number of users taking advantage of the mobile Internet is at or near “critical mass,” providing a customer base for investment in new networks, in new devices, and in new applications, thus further fueling market growth.
- **High-Bandwidth Data Apps** – Today, wireless data applications are driving demand for capacity; many popular applications, such as video, consume high bandwidth.
- **True Broadband User Experience** – The widespread availability of 3G networks employing technologies such as EV-DO or HSPA gives users a “true broadband experience” and allows the use of a wide range of applications. As users become more satisfied with their experience, they consume even more bandwidth using more applications, which then drives operators to enhance their networks and drives developers to continue creating bandwidth-intensive applications.
- **Smartphone Effect** – The widespread acceptance of smartphones with advanced capabilities stimulates wireless data usage.
- **Application Innovation Effect** – Many of today's applications, such as YouTube and social networking, were never anticipated when broadband networks were planned, but “capability encourages innovation.” This is part of the virtuous cycle in which more capable networks spur innovation in devices and applications, which in turn spurs innovation in spectrum usage and network design and drives a need for more spectrum.
- **Innovative Pricing** – Operators have succeeded in moving most voice users to bucket plans rather than usage-based pricing, and likewise flat-rate or bucket-of-bytes plans are commonly applied to data usage.

- **Fixed-Mobile Substitution and Convergence** – Customers are using wireless instead of wireline services and devices for both voice and data to a rapidly increasing degree.²⁰⁹

As a result of these and other factors, data traffic is growing at an exponential rate, and will drive the need for additional spectrum. While estimates vary, there appears to be a consensus that wireless data traffic volume is more than doubling each year,²¹⁰ and it is expected that data traffic volume will grow to hundreds of times its current level in five to ten years.²¹¹

The high growth rates in mobile data will occur not only in the U.S., but globally. If the U.S. is to continue holding a leadership role in wireless service innovation and investment – which is increasingly driven by data – it must move forward quickly to identify and make available the spectrum resources needed to avoid falling behind China, Japan, and other nations. As Chetan Sharma describes the situation:

It is important to understand the importance of spectrum in the continued growth of mobile data services. In countries where sufficient spectrum is not allocated for 4G and the related services or the spectrum is not harmonized with rest of the world or the spectrum caps are imposed [sic], these countr[ies] will stand at a big disadvantage as the limited spectrum will [be] a technical barrier and the lack of harmonization a business one. By 2010, the mobile broadband penetration will surpass fixed penetration globally. Countries that are behind the curve in spectrum allocation will lag behind as lack of spectrum will delay the launch of broadband services.²¹²

CTIA urges the Commission to ensure the U.S. does not fall behind the spectrum curve.

²⁰⁹ *Id.* at 6-11. While Rysavy emphasizes the role of smartphones, Sharma believes that computers with wireless data cards, including the increasingly popular “netbooks,” will be an even more significant driver of data usage. Chetan Sharma Consulting, *Managing Growth and Profits in the Yottabyte Era*, at 8-9, 11-12 (2009), available at <http://www.chetansharma.com/yottabyteera.htm>.

²¹⁰ See Rysavy Consulting, *Mobile Broadband Spectrum Demand*, at 12, 13; see also Chetan Sharma Consulting, *Managing Growth and Profits in the Yottabyte Era*, at 10.

²¹¹ AT&T has projected that its own wireless traffic to 250-600 times its 2007 level by 2018. Rysavy Consulting, *Mobile Broadband Spectrum Demand*, at 12, 13. Sharma expects traffic to have grown to 300 times its 2008 level by 2014. Chetan Sharma Consulting, *Managing Growth and Profits in the Yottabyte Era*, at 10.

²¹² See Chetan Sharma Consulting *Managing Growth and Profits in the Yottabyte Era*, at 16.

2. Identifying New Spectrum Resources

CTIA often has observed that spectrum is the driving input to the competition and innovation in the wireless industry, and that additional spectrum is necessary to ensure wireless carriers' continued ability to bring services to market that promote consumer welfare and enhance the Nation's productivity. As Blair Levin, the Executive Director of the Commission's Omnibus Broadband Initiative, recently acknowledged, a "key input" in the broadband plan "is spectrum and everyone agrees, there is not enough of it. Moreover, demand curves from new uses by smartphones suggest a massive increase in demand ahead for that input."²¹³ Chairman Genachowski has echoed this belief.

CTIA has asked the FCC and NTIA to identify a significant amount of new spectrum – with a target of at least 800 MHz – for reallocation to licensed commercial use. In addition, to find the large quantity of additional spectrum that is needed, a comprehensive spectrum inventory should be undertaken that will identify underutilized bands. CTIA supports plans to create a comprehensive inventory of spectrum as an important means to identify new allocations for licensed mobile wireless services. CTIA applauded the introduction by Senators Kerry and Snowe and Congressmen Waxman and Boucher of legislation to require such an inventory,²¹⁴ calling it "a good first step toward identifying where that spectrum will come from."²¹⁵ The Bills will require the Commission and NTIA to identify and report on spectrum use by government spectrum assignees, non-government licensees, and unlicensed devices.

²¹³ Blair Levin, Executive Director, Omnibus Broadband Initiative, Federal Communications Commission, *A Framework for Universal Broadband* (Speech at the Udwin Breakfast Group, Sept. 2, 2009), *available at* http://blog.broadband.gov/?page_id=185 (last visited Sept. 29, 2009).

²¹⁴ Radio Spectrum Inventory Act, S. 649, 111th Cong. 1st Sess. (2009); H.R. 3125, 111th Cong. 1st Sess. (2009).

²¹⁵ Press Release, CTIA, CTIA–The Wireless Association® Applauds Introduction of Radio Spectrum Inventory Act (March 20, 2009), *available at* <http://www.ctia.org/media/press/body.cfm/PRID/1803>.

As detailed in a recent filing, CTIA believes that any inventorying effort should be combined with a dual commitment from U.S. policymakers.²¹⁶ First, U.S. policymakers should launch an effort to identify and allocate at least 800 MHz of additional spectrum for licensed commercial wireless use within the next six years. Recognizing the long lead times necessary to achieve such major spectrum allocations, this process should begin immediately. Second, policymakers should work to meet short-term needs by pairing and allocating readily available spectrum in the 1755-1780 MHz and 2155-2180 MHz bands for licensed commercial wireless use as quickly as possible.

The essential first step in conducting any such inventory is to identify *government* spectrum usage, because it is likely that underutilized spectrum currently assigned to the Federal government will be a critical source for spectrum that can be repurposed. It is established Federal policy that government users should rely on commercial radio services where possible, and the public is well served by opening underutilized government spectrum to non-government use.²¹⁷

Given the long-standing recognition that the government is not always an efficient user of spectrum resources, there is a law for transitioning underused spectrum from government to commercial use, while ensuring that government users' communications needs continue to be met: the Commercial Spectrum Enhancement Act ("CSEA").²¹⁸ The CSEA has been used previously to relocate Federal users out of the 1710-1755 MHz band and to clear the way for commercial Advanced Wireless Services ("AWS-1") licensees. Currently, NTIA is conducting an inquiry

²¹⁶ See generally Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA, to Julius Genachowski, Chairman, Federal Communications Commission, *et al*, GN Docket No. 09-51 (filed Sept. 29, 2009) ("*CTIA Spectrum Demand Ex Parte*").

²¹⁷ NTIA, SPECTRUM MANAGEMENT FOR THE 21ST CENTURY: THE PRESIDENT'S SPECTRUM POLICY INITIATIVE — FEDERAL STRATEGIC SPECTRUM PLAN 9-11 (March 2008), available at <http://www.ntia.doc.gov/reports/2008/FederalStrategicSpectrumPlan2008.pdf>.

²¹⁸ Pub. L. 108-494, Title II, 118 Stat. 3986, *codified at* 47 U.S.C. §§ 309 (j) (3), 921, 923, 928 & note. See also *Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures, Report and Order*, 21 FCC Rcd 891 (2006).

regarding the lessons that can be learned from that process,²¹⁹ and CTIA submitted its comments just last month.²²⁰ CTIA's comments offered suggestions as to how the process can be streamlined – as discussed below in more detail, they include proposals for NTIA to play a greater role in coordinating Federal interests, as well as increased transparency and information availability.²²¹ Conducting a Federal government spectrum inventory would further those objectives and would facilitate carrying out the purposes of CSEA.

The spectrum inventory may also identify underutilized non-government spectrum that can be put to a higher and better use as commercial mobile wireless spectrum. The Commission has a well-established procedure for clearing and repurposing non-government spectrum in the approach used to relocate the fixed microwave licensees in the Emerging Technologies docket.²²² This approach gives the incumbent licensee a defined period of time during which it may negotiate an agreement with the new licensee for voluntary relocation, after which it may be subject to mandatory relocation at the expense of the new licensee.

This approach has worked well. It represents an appropriate balance of burdens, in that the new licensee ultimately assumes the cost of relocating the incumbent and gives both parties an incentive to reach agreement early. The Commission and its licensees have experience with this system, which has been modified multiple times in response to unforeseen concerns and has

²¹⁹ “Relocation of Federal Systems in the 1710-1750 MHz Frequency Band: Review of the Initial Implementation of the Commercial Spectrum Enhancement Act,” *Notice of Inquiry*, Docket 0906231085-91085-01, 74 Fed. Reg. 32131 (July 7, 2009) (“CSEA NOP”).

²²⁰ Comments of CTIA–The Wireless Association, NTIA Docket 0906231085-91085-01, filed August 21, 2009, available at <http://www.ntia.doc.gov/comments/2009/comments.html>.

²²¹ See *infra* Section V.B.1.

²²² See *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, First Report and Order and Third Notice of Proposed Rule Making*, 7 FCC Rcd 6886 (1992), *Second Report and Order*, 8 FCC Rcd 6495 (1993); *Third Report and Order and Memorandum Opinion and Order*, 8 FCC Rcd 6589 (1993); *Memorandum Opinion & Order*, 9 F.C.C.R. 1943 (1994); *Second Memorandum Opinion & Order*, 9 F.C.C.R. 7797, 7802 (1994), *aff'd sub nom. Ass'n of Public-Safety Communs. Officials-International v. FCC*, 76 F.3d 395 (1996).

withstood judicial review.²²³ Given that this system is tried, tested, and refined, there is no need to “reinvent the wheel,” which would inevitably give rise to a new set of unforeseen complications requiring lengthy proceedings to resolve.

B. The Market Demonstrates That An Exclusive-Use, Flexible Rights Spectrum Licensing Framework Results In Breathtaking Innovation

CTIA is encouraged by the Commission’s statement in the *Innovation NOI* that it intends “to build upon the Commission’s policies that have facilitated innovation . . . drawing on what has worked well and extending or expanding these policies where appropriate.”²²⁴ What has worked exceptionally well is the exclusive-use, flexible rights licensing model that evolved in the 1990s. This model has stimulated a virtuous cycle in the mobile wireless ecosystem, resulting in tremendous investment and innovation that continues to this day.

1. Exclusive-Use, Flexible-Rights Licensed Spectrum – A Spectrum Rights Regime Delivering Investment And Innovation

Without exclusive licenses, it is doubtful that the tremendous innovation and massive investment that has occurred in the mobile wireless services market would have come to pass – innovation and investment that has put wireless phones in the hands of nearly every American, while driving prices downward every year for two decades.²²⁵ Companies will not invest billions of dollars in infrastructure for wireless service if they have little certainty that they can operate it at a planned level of quality and modify it to meet the demands of a dynamic, evolving marketplace.

²²³ See *supra* note 221.

²²⁴ *Innovation NOI* at ¶ 24.

²²⁵ In 1993, the average revenue per minute was 44 cents and users averaged 140 minutes of calls per month; by 2007, the average revenue per minute had fallen to 6 cents, and the average user made 769 minutes of calls per month, but the average monthly bill was more than \$11 lower than in 1993. *Thirteenth CMRS Competition Report* at 93 (Table 12).

This certainty, in turn, is tied to a licensee's bundle of spectrum usage rights, including protection from interference. And without that investment in ubiquitous infrastructure, manufacturers and application developers would have turned their innovation to other sectors.

An exclusive-use license, like a long-term lease for land, gives the holder a bundle of well-established rights and sets boundaries with certainty within which those rights may be exercised. Just as a lease (and the related zoning laws) defines for a landholder whether there are many or few encumbrances on the land, a license (and the related FCC rules) defines for the licensee any limits on how the spectrum can be used. The spatial and temporal boundaries are set, as well: the landholder knows where the property line is, defining where the landholder's rights end and neighboring parties' rights begin – and, importantly, an exclusive licensee knows where spectrum may be used and protected from harmful interference by others.

In the *Innovation NOI*, the Commission asks how interference protection considerations affect innovation.²²⁶ The answer is that they go to the heart of innovation. In the case of exclusively licensed services, the licensee has regulatory assurance that it is the only authorized user of spectrum within the licensed area and that other spectrum users are not allowed to harmfully interfere with the licensee's lawful use of the spectrum. Such licensees, and the manufacturers supporting them, are given incentives to innovate by the fact that they have unfettered use of the spectrum (consistent with FCC rules), and that the licensee will be able to take full advantage of any increase in efficiency that results.

The fact that wireless operators hold exclusive-use licenses gives them the certainty needed to invest in new technologies that provide more efficient spectrum usage – wringing more calls or bytes out of every Hertz, so to speak. Many of these technologies take advantage of sophisticated

²²⁶ *Innovation NOI* at ¶ 24.

error control techniques that allow a marginal signal to get through despite significant interference, with the result being processed so as to appear higher in quality. They are able to take advantage of these technologies because they know that they will reap the benefit of their investment. If their spectrum was not exclusive-use, licensees would have little incentive to make their own signals more interference resistant, because that would simply allow the other users of the spectrum to interfere more without destroying the signal.

Exclusive-use spectrum, and its protection from harmful interference, ensures that innovation can be directed at using lower power transmissions, spurred by confidence that others will not be allowed to step on top of the weak signals – which means that there will be less intrasystem interference and thus more efficient use of spectrum.²²⁷ This means that innovation and investment can be directed at management of intrasystem interference in a coordinated fashion, without the uncertainty that would result if others could use the spectrum as well. It means that innovation can be directed at making the “best case” use of spectrum, rather than overcoming the worst case.

The Commission embraced exclusive-use licensing and also introduced a measure of licensee flexibility in the early cellular service rules,²²⁸ and in the 1990s it took a series of giant leaps in the direction of licensee flexibility:

²²⁷ See, e.g., FCC Spectrum Policy Task Force, *Report of the Interference Protection Working Group*, at 12, 16 (Nov. 15, 2002), available at <http://www.fcc.gov/sptf/files/IPWGFinalReport.pdf> (“SPTF Interference Protection Report”) (discussing the fact that cellular and PCS networks make extensive use of automatic transmitter power control (“ATPC”) on both the uplink and downlink); see also *id.* at 17 (concluding that “signal sensing and adaptive technology, such as that now used for ATPC, will become increasingly sophisticated and could play a major role in the self-regulation of interference”).

²²⁸ See *Cellular Communications Systems*, Report and Order, 86 FCC 2d 469 (1981), *recon. in part*, 89 FCC 2d 58 (1982), *further recon.*, 90 FCC 2d 571 (1982), *recon. denied*, 56 Rad. Reg. 2d (P&F) 1583 (1984); *Revision and Update of Part 22 of the Public Mobile Radio Service Rules*, Report and Order, 96 F.C.C.2d 769 (1983); Order on Reconsideration, 99 F.C.C.2d 311 (1984); Order on Reconsideration, 101 F.C.C.2d 799 (1985); Order on Further Reconsideration, 2 FCC Rcd 1798 (1987) (adopted rules giving licensees flexibility to use alternative modulation technologies, including digital, without further authority, authorized mobile service licensees to provide “ancillary” fixed services without prior authority); *Liberalization of Technology and Auxiliary Service Offerings in the Domestic*

- Purely geographically defined service areas within which licensees were free to construct facilities where needed (subject to any necessary tower clearances).
- Licensee flexibility to employ any technology or air interface standard, channelization.
- A default maximum signal strength at the boundary was specified, permitting licensees to negotiate commercially reasonable arrangements to avoid harmful interference.
- A broad definition of PCS gave licensees flexibility to provide virtually any service, mobile or fixed, and this standard was applied to cellular licensees as well.²²⁹

The freedom to choose technologies allowed competing service providers to choose different approaches, change technologies when needed, and evolve their systems from 2G digital voice networks to higher-speed 2.5G and then 3G networks. With no need for regulatory intervention, licensees have already begun the transition to 4G technology. This confirms the observation of the Spectrum Policy Task Force over five years ago regarding the benefits of flexible rights:

Flexibility enables spectrum users to make fundamental choices about how they will use spectrum (including whether to use it or transfer their usage rights to others), taking into account market factors such as consumer demand, availability of technology, and competition. *By leaving these choices to the spectrum users, this approach tends to lead to efficient and highly-valued spectrum uses.*²³⁰

The certainty associated with exclusively-licensed spectrum encourages investment in facilities and infrastructure to make use of such spectrum, because the licensee knows that it will be able to make use of that infrastructure in a productive business. This is akin to landholders with

Public Cellular Radio Telecommunications Service, Report and Order, 3 FCC Rcd 7033 (1988); Memorandum Opinion and Order, 5 FCC Rcd 1138 (1990).

²²⁹ See *New Personal Communications Services*, Second Report and Order, 8 FCC Rcd 7700 (1993); Memorandum Opinion and Order, 9 FCC Rcd 4957 (1994); Third Memorandum Opinion and Order, 9 FCC Rcd 6908 (1994).

²³⁰ Report, FCC Spectrum Policy Task Force, ET Docket No. 02-135, at 16 (2002) (emphasis added).

clear titles or exclusive lessees investing in tilling the soil and planting crops, or building offices or factories, confident that they will be able to take the full benefit of that investment.

2. CMRS Providers Have Driven Enormously Efficient Use Of Mobile Wireless Spectrum

Today, more calls and more bytes of data are transmitted in a given amount of time and spectrum than ever before. This is because the commercial wireless licensees “mine” their spectrum intensively. In other words, they make highly efficient use of their spectrum. As a result, the number and nature of devices and services supported by the spectrum increases constantly.

As demonstrated in Figure 14 above, United States mobile wireless providers are the most efficient users of spectrum worldwide. U.S. carriers pack more subscribers using more minutes of calling and more megabytes of data into each megahertz of spectrum than any other nation’s providers. These carriers have achieved this efficiency by making significant investments in highly advanced technologies, along with designing and re-designing networks to get the most out of their spectrum holdings.

This intensive and efficient spectrum use typically entails transmitting signals at lower and lower power levels, because innovative technology allows the reception and use of extremely weak signals that at one time would have been considered unusable.²³¹ This fact has several important consequences. First, the “noise floor” – actually, the “noise-plus-interference floor” – within the commercial mobile bands has decreased over time.²³² As spectrally or geographically neighboring systems utilize lower signal levels, their potentially interfering signals reaching another system are

²³¹ See, e.g., E. Ekudden, R. Hagen, I. Johanssen, and J. Svedberg, *The Adaptive Multi-Rate Speech Coder*, IEEE Speech Coding Workshop, at 119 (1999), available at http://www.ericsson.com/technology/research_papers/multimedia_technologies/papers/the_adaptive_multi_rate_speech_coder.shtml.

²³² In a 2002 filing, Cingular Wireless noted that the noise floor in the cellular band in rural areas was lowered by about 7 dB during the 1990s, based on a comparison of 1997 measurements to measurements earlier in that decade, and that the noise floor had been reduced even further since 1997 in rural, urban, and suburban areas. See Comments of Cingular Wireless, ET Docket 02-135, at 45 n.98 (filed July 8, 2002).

even more attenuated, allowing the perceived ambient level of thermal noise and interference to become closer to the thermal noise floor resulting from the laws of physics.²³³ This in turn allows the use of ever more sensitive receivers and even lower transmitter power.²³⁴ In other words, exclusive-use licensing – which allows the licensee to focus on managing intrasystem interference – leads not only to more efficiency, but also to a lower noise floor.

The second consequence of the use of very weak signals is that these signals are increasingly subject to interference as mobile devices come close to each other. The Commission recognized in the *Innovation NOI* that “the trend of more radio services and devices seeking to use extremely weak signals and mobility bringing products in closer proximity to each other is making the risk of interference a more acute problem.”²³⁵ This makes interference protection even more important and makes the preservation of exclusive-use licensees’ bundle of usage rights all the more critical to continued innovation and investment.

3. Underlays And Other Opportunistic Uses In Licensed Wireless Spectrum Could Undermine The Mobile Wireless Market

The model described above – exclusive-use licensees investing in increasingly efficient technology that relies in part on reduced power levels to achieve increased capacity – falls apart if persons other than the exclusive licensee are permitted access to the same spectrum through “underlay” or opportunistic-use proposals. As former FCC Chief Economist Michael L. Katz stated, “[t]he creation of significant mandatory underlay rights would very likely reduce the

²³³ See *id.* at 45. (“The move toward digital service has further lowered the power levels being transmitted at cellular frequencies and thereby reducing prevailing self-interference levels. As a result, the noise level resulting from signals of undesired mobile units has decreased dramatically, causing a reduction in the overall noise floor at base station receive sites.”)

²³⁴ “Licensees who would otherwise seek to deploy cutting-edge technologies that necessarily operate with a lower signal-to-interference ratio will not bring those offerings to the public if they fear the introduction of secondary signals will detract from the quality of their service offering. This is a major concern since, as newer CMRS technologies increase the density of information per hertz, CMRS signals are becoming more – not less – susceptible to interference.” Comments of CTIA. ET Docket No. 03-237, at 10 (filed April 5, 2004) (“2004 CTIA Comments”).

²³⁵ *Innovation NOI* at ¶ 34.

incentives and ability of CMRS incumbent licensees to innovate and invest. These investment and innovation distortions would harm consumers and economic efficiency.”²³⁶

If others can transmit in that band in the same area, the licensee loses the incentive to increase efficiency and utilize extremely low power, because the efficiency increases will be realized by others. Moreover, other operators in the band will increase the noise-plus-interference floor in the spectrum – which will induce the licensee to employ higher powers and use less-sensitive receivers, thereby lowering capacity and efficiency and presenting a higher level of potential interference to adjacent systems.²³⁷ For example, third party interference can create a local rise in the noise floor to the point where the required carrier-to-interfere ratio exceeds the design specifications for a mobile operating at the fringes of a cell site’s reliable service area. This would manifest itself to the consumer through slower data transmissions with greater numbers of packet retransmissions, decreased coverage, and more dropped calls in cell-to-cell hand-off.²³⁸ This is the reverse of the virtuous cycle that characterizes the exclusive-use, flexible-rights licensing regime.

In this connection, we note that there has been little experience with successful deployment of underlays using spectrum in bands that are otherwise subject to exclusive licensing. For

²³⁶ See Michael L. Katz, *Don’t Let Short-Term Reforms Interfere with Long-Term Policy Goals* at 6, Attachment to Comments of CTIA, ET Docket No. 03-237 at 18-19 (filed April 5, 2004) (“Katz”).

²³⁷ “[I]ncreasing the noise floor by even a few dB may adversely impact existing licensed systems and their customers in a number of ways, such as: (1) coverage, (2) system capacity, (3) reliability of data throughput, and (4) quality of voice service. To overcome these effects, licensees may have to reconfigure previously optimized systems and deploy additional facilities to regain what the noise floor increase erased.” *SPTF Interference Protection Report* at 10 (quoting comments of Cingular Wireless).

²³⁸ See 2004 CTIA Comments at 6-7 (“An even greater factor for the future of CMRS network design is that the migration path for wireless systems relies on wideband spread spectrum modulation techniques, a technology that is dependent upon maintaining an adequate signal-to-interference ratio. . . . For the uplink channels in [CDMA] systems, the per-data bit transmit power of each mobile unit is continuously controlled so that the signals from each unit arrive at the base station at about the same level. Thus, the mobile unit transmit power is controlled so that the received signal at the base station remains at a level sufficient to allow reception within a target frame error rate to maintain service quality. When the noise and interference level at the input base station receivers are raised, the average transmit power of each mobile unit must increase accordingly to maintain a consistent level of service. Similarly, when the noise plus interference floor is raised, the coverage area decreases by a proportional amount.”).

example, Ultra-Wideband (“UWB”) technology,²³⁹ which spreads across many different licensed bands, has found only very limited application. Likewise, little has been heard about the Multichannel Video and Data Delivery Service (“MVDDS”), which is essentially a licensed underlay in the spectrum primarily licensed to the Direct Broadcast Satellite (“DBS”) service, even though that spectrum was auctioned over four years ago.²⁴⁰

4. Secondary Markets And New Service Paradigms Are Enabling Opportunities For Innovators

It is important to note, however, that new approaches to spectrum usage *within* the exclusively licensed category have been providing new opportunities for innovation. Indeed, as Katz observed, “reliance on secondary markets and other economic incentives can be expected to lead to more efficient deployment of broadband wireless networks and other new technologies than would creation of government-mandated underlay rights.”²⁴¹ In addition to assignments, transfers, partitions, and disaggregations of licensed spectrum rights, new secondary markets opportunities are now emerging.

First, the area of leasing is fairly new,²⁴² and the best ways to take advantage of leasing are still developing. Spectrum exchanges such as Spectrum Bridge provide licensees with a way to identify and price spectrum that is available for leased use. This can be particularly important in rural areas. For example, the president of the Rural Telecom Group (“RTG”) stated that “Spectrum

²³⁹ See, e.g., News Release, Federal Communications Commission, *NEW PUBLIC SAFETY APPLICATIONS AND BROADBAND INTERNET ACCESS AMONG USES ENVISIONED BY FCC AUTHORIZATION OF ULTRA-WIDEBAND TECHNOLOGY*, (Feb. 14, 2002), available at http://www.fcc.gov/Bureaus/Engineering_Technology/News_Releases/2002/nret0203.html (last visited Sept. 23, 2009).

²⁴⁰ See generally FCC Wireless Telecommunications Bureau, *Auction 53 Multichannel Video Distribution & Data Service (MVDDS) Summary*, available at http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=53 (last visited Sept. 29, 2009).

²⁴¹ Katz at 19.

²⁴² See generally *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 20604 (2003), Second Report and Order, Order on Reconsideration, and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd 17503 (2004), Second Order on Reconsideration, 23 FCC Rcd 15081 (2008).

Bridge simplified the process of finding the right spectrum to expand my clients' and RTG members' wireless networks. I was able to quickly search through hundreds of millions of dollars worth of available spectrum and find exactly what my clients needed."²⁴³ As wireless operators become more familiar with such exchanges, it is likely their use will become increasingly common.

Further, as Michael Katz observed five years ago, carriers have significant incentives to "create underlay rights or sharing mechanisms" within their own licensed framework.²⁴⁴ Thus, it is not surprising to now see innovative approaches involving embedded devices – such as embedding commercial wireless capability into Amazon.com's Kindle e-book reader or a Tom-Tom GPS navigator – that can also make wireless data communications capacity available to device developers without the need to develop specialized networks or take specific advantage of the secondary market rules. In addition, carriers are using their own spectrum for consumer-controlled underlays in the form of femtocells and picocells. Wireless access to books, maps, and traffic information can be bundled together with a device and its associated content. Likewise, the provision of network capacity for M2M devices such as smart grid equipment gives the device maker a virtual private wireless network.²⁴⁵ A network operator's sale of capacity to the developer or marketer of such devices is engaging in the functional equivalent of a secondary market transaction.

CTIA does wish to point out one potential obstacle to an efficient secondary market – specifically, license encumbrances such as "use it or lose it" build-out requirements. Such

²⁴³ See Press Release, Spectrum Bridge, Wireless Carriers, Utilities, Railways And Others Have Made Specex.Com The Number One Source For Secondary Market Spectrum, (Aug. 10, 2009) *available at* http://spectrumbridge.com/pdf/SpecExNumber1SourceSecondarySpectrum_7-30.pdf.

²⁴⁴ "CMRS providers can be expected to continue to innovate and invest in ways that allow them to generate more economic value from their licensed spectrum—if market forces are allowed to operate. CMRS providers can be expected both to invest in new technologies to make new and greater use of the spectrum themselves (e.g., roll out various forms of broadband networks) and to create underlay rights or sharing mechanisms, where efficient." Katz at 18.

²⁴⁵ See *supra* Sections I.C.2 and I.C.4.

obligations place a huge question mark over the valuation of licenses, acting as a significant barrier to efficient transactions. The Commission should avoid imposing such requirements on licensed spectrum and instead rely on secondary market transactions to ensure that spectrum is used efficiently and productively to serve the public.

V. IN ADDITION TO THE NEED FOR MORE SPECTRUM, THE COMMISSION SHOULD CONSIDER THE EFFECT OF REGULATORY INITIATIVES AND WHETHER THEY WILL ENCOURAGE INNOVATION AND INVESTMENT

As a final matter, the Commission invites comment on its role in supporting and encouraging wireless innovation and investment.²⁴⁶ Among other things, the Commission seeks input on: (1) how its “rules or policies . . . might be amended to better accommodate such development without impairing the Commission’s purposes”; (2) “elements of [its] rules and policies [that] have been successful in stimulating and promoting innovation and investment”; and (3) “the impact of regulatory certainty and regulatory flexibility on innovation and investment.”²⁴⁷

As CTIA has noted above, wireless innovation and growth depend on additional spectrum, and the Commission should place its emphasis on that front. In addition, there are a number of other areas for attention, including wireless infrastructure deployment, spectrum availability, equipment and STA authorizations and network management. The right approach in these areas will ensure the continued cycle of innovation and investment in the mobile ecosystem.

A. The Commission Should Facilitate The Timely Deployment Of Wireless Infrastructure

As discussed in Section I.B.2 above, infrastructure is one of the critical components of the virtuous cycle of wireless innovation and investment. Indeed, the *Innovation NOI* itself recognizes that towers “are the backbone of our wireless infrastructure, supporting both commercial and

²⁴⁶ *Innovation NOI* at ¶ 11.

²⁴⁷ *Id.*

private wireless services, in addition to critical public safety and homeland security wireless communications.”²⁴⁸ Consequently, the ability of wireless service providers to timely deploy wireless tower facilities is essential to advance investment in the wireless industry. The Commission, therefore, asks whether there are “additional measures that the Commission may implement to increase the speed and efficiency of processing tower-related matters?”²⁴⁹

The answer is yes – the Commission should grant CTIA’s Petition for Declaratory Ruling with regard to sections 332(c)(7)(B) and 253 of the Act relating to state and local review of wireless facility siting.²⁵⁰ The delays associated with local zoning reviews are a critical stumbling block in the industry’s efforts to deploy infrastructure with speed and efficiency. For instance, it often takes more than a year to obtain local approval for a wireless site. Moreover, some zoning authorities are hampering deployment by refusing applications based solely on the presence of a single service provider or by requiring all applicants to obtain variances before placing facilities.²⁵¹ These systemic delays have become even more problematic as wireless service providers build out the AWS-1 and 700 MHz spectrum licensed in the past few years.

Consistent with the relief requested in CTIA’s Petition, the Commission should:

- Establish timeframes within which local zoning authorities must act on tower siting and wireless facility applications (45 days for collocation; 75 days for other facilities);
- Either deem an application granted by operation of law if a zoning authority does not act within these timeframes or establish a presumption that a reviewing court should issue an injunction granting the application unless the zoning authority justifies its failure to comply with these timeframes;

²⁴⁸ *Id.* at ¶ 52.

²⁴⁹ *Id.*

²⁵⁰ *CTIA Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and Preempt Under Section 253 State and Local Ordinances that Classify all Wireless Siting Proposals as Require a Variance*, WT Docket No. 08-165 (filed July 11, 2008) (“CTIA Petition”).

²⁵¹ See CTIA Petition at 14-16; CTIA Reply Comments at 4-8.

- Clarify that a zoning authority may not deny an application filed by one provider based on the presence of another wireless provider in the area; and
- Announce that a successful preemption challenge under section 253 of the Act will invalidate zoning ordinances that require all applicants to obtain variances, regardless of the proposed facility's location or scope.

Grant of CTIA's Petition will restore the balance between the need for timely deployment of wireless infrastructure and the exercise of local zoning authority. The Commission should swiftly take action to rectify this situation.

B. The Commission Should Improve Its Spectrum Management Practices To Make Spectrum Available For New Uses

As discussed above, innovation in the wireless industry is absolutely dependent upon access to spectrum and the availability of new spectrum.²⁵² One method the Commission has utilized to make additional spectrum available is to repurpose or free up spectrum for additional licensees or users. There are a number of steps the Commission should consider taking in order to enhance its spectrum management practices as they relate to repurposing and clearing spectrum, as well as interference protection.

1. Repurposing Spectrum And Spectrum Clearing Of Federal Spectrum

In CTIA's view, new spectrum is likely to become available through repurposing Federal spectrum pursuant to the CSEA. The Commission should therefore consider improvements in the process for identifying spectrum for future reallocation. The Commission should also evaluate what, if any, steps it can take to improve existing processes for spectrum reallocation, and to reduce regulatory burdens associated with the Federal/non-Federal sharing of radio systems, as well as suggestions on how the process can be streamlined. In particular, the Commission should review

²⁵² See *supra* Section IV; see also *Innovation NOI* at ¶ 20.

carefully the “lessons learned” from the ongoing AWS-1 spectrum relocation process with a view to making the CSEA reallocation process as efficient and effective as possible.²⁵³

In this regard, CTIA believes that the problems associated with the AWS-1 reallocation demonstrate the need for greater information, transparency and coordination between Federal and commercial entities in future relocations under the CSEA. As CTIA recently commented to NTIA:

The more commercial carriers know about Federal systems and licensee priorities, the better they will be at working within the relocation structure to achieve the best results for their customers and the public generally. The more Federal users understand about commercial licensees’ plans and priorities, the more they will be able to coordinate and pre-plan to avoid unnecessary spectrum usage conflicts.²⁵⁴

To that end, the Commission should take certain steps to improve the CSEA process.²⁵⁵ For instance, the Commission should work closely with NTIA to improve the dissemination of information so that applicants for reallocated spectrum will have a clear understanding of the technical requirements of incumbents and their relocation needs. In particular, the Commission, together with NTIA and other Federal interests, should develop mechanisms that permit sharing of information that may not be routinely available for public inspection or may be classified. For instance, the government should consider permitting commercial entities to access confidential data if they employ persons with appropriate security clearances or hire third-party entities with such clearances.²⁵⁶ The government should also consider whether data could be made available pre-

²⁵³ This review can be undertaken in conjunction with the review process recently initiated by the NTIA. *See supra* Section IV.A.2 for a further discussion of the *CSEA NOI*.

²⁵⁴ *See* Comments of CTIA at 3, *CSEA NOI* (filed Aug. 21, 2009) (“CTIA CSEA Comments”).

²⁵⁵ *See id.* at 7-10.

²⁵⁶ *Id.* at 8.

auction to bidders who execute non-disclosure agreements just as auction winners were granted access to an enhanced data set.²⁵⁷

The Commission should also work with NTIA to develop an automated, on-line mechanism for conducting the relocation process to the extent feasible. This process has worked well with regard to the millimeter wave bands where the Commission and NTIA developed an on-line database that allows for virtually instantaneous coordination between Federal and non-Federal systems operating in the 70-80-90 GHz bands.²⁵⁸ The U.S. Department of Commerce Spectrum Management Advisory Committee (“CSMAC”) promotes adoption of such an approach.²⁵⁹ CSMAC also identifies a system developed by the U.S. Department of Defense for spectrum relocation purposes that has substantially improved the transparency and availability of information and could serve as a possible interim step toward an automated relocation process.²⁶⁰

Finally, the Commission should work to establish certainty regarding relocation timelines. As CSMAC noted in its Recommendations for Spectrum Reallocation, there was substantial uncertainty in the AWS-1 relocation process regarding when the relocation process actually started.²⁶¹ Commercial entities expected relocation to start immediately upon their payment for their licenses, while Federal entities often took the position that relocation did not start until they actually received their CSEA funds.²⁶² In the future, the relocation process timeline should be clearly defined to avoid this confusion. The timeline also should recognize and accommodate

²⁵⁷ *Id.*

²⁵⁸ See *Allocation and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands*, Report and Order, 18 FCC Rcd 23318 (2003); News Release, NTIA, *NTIA and FCC Launch On-Line Registration for High-Speed Wireless Links Sharing Spectrum in the 70-80-90 GHz Bands* (Feb. 8, 2005).

²⁵⁹ See *Recommendations for Improving the Process for Identifying Spectrum for Future Reallocation or Sharing*, CSMAC, at 21-22 (Aug. 21, 2008) (“CSMAC Recommendations for Spectrum Reallocation”); see also *Transition Report*, CSMAC, at 30 (Dec. 13, 2008).

²⁶⁰ CSMAC Recommendations for Spectrum Reallocation at 21-22.

²⁶¹ *Id.* at 13.

²⁶² *Id.*

commercial licensees’ expectations regarding pre-relocation coordination and deployment.²⁶³ Unnecessary delays in the relocation process simply serve to disrupt the virtuous cycle and delay the innovation and investment that flows from new spectrum opportunities.²⁶⁴

In addition, the specter of interference in the 700 MHz bands – heralded as “beachfront property” for wireless broadband provision – from unauthorized wireless microphone users has held back the potential of this important allocation. Both the wireless industry and Public Safety have raised concerns about the need for the Commission to act. To be effective, Commission action cannot simply declare that all wireless microphone and LPAS operations must cease in the band; the Commission must also allow these users (authorized and unauthorized alike) to transition into alternate spectrum readily available for such operations. Prompt and decisive action that will result in wireless microphone operations vacating the 700 MHz band will provide wireless carriers with the access to spectrum needed to innovate and invest to meet consumer demand.

Finally, another spectrum band suffering from impediments to full deployment is the BRS band. Licensees in the BRS bands must first relocate Broadcast Auxiliary Service licensees before full utilization of the bands for which they are licensed.

2. Interference Protection

As discussed above, the virtuous cycle of wireless innovation and investment is maximized in a controlled interference environment maintained through exclusive-use, flexible rights licensing.²⁶⁵ Nevertheless, as noted in the *Innovation NOI* “the trend of more radio services and devices seeking to use extremely weak signals and mobility bringing products in closer proximity to

²⁶³ See CTIA CSEA Comments at 9-10.

²⁶⁴ See *supra* Section I.B.1.

²⁶⁵ See *supra* Section IV.B.

each other is making the risk of interference a more acute problem.”²⁶⁶ Interference issues thus will continue to become more pronounced and play an increasingly important role in the continuation of wireless innovation and investment.

CTIA believes that technical issues are best left to engineers to resolve. In that regard, the Commission should look to its revitalized Technological Advisory Council (“TAC”) as a source of ideas for addressing interference questions.²⁶⁷ The TAC represents a diverse array of recognized technical experts that will provide advice to the Commission and make recommendations on technical questions, helping the Commission stay abreast of innovations and new developments in the communications industry.²⁶⁸

C. The Commission Should Take Steps to Streamline Equipment and Special Temporary Authorizations

1. Equipment Authorizations

Equipment development represents another critical aspect of the virtuous cycle of wireless innovation and investment. To that end, the Commission seeks comment on “ways in which the equipment authorization process could be modified or relaxed in order to simplify the process.”²⁶⁹ CTIA believes strongly that a more streamlined process would allow manufacturers to lower development costs and bring products to market more quickly, which in turn would spur new wireless investments and innovation and benefit the public.

The Commission should therefore take steps to ensure that manufacturers’ sensitive commercial information is treated as confidential. Current confidentiality restrictions limit the ability of carriers and manufacturers to protect commercially sensitive information prior to device

²⁶⁶ *Innovation NOI* at ¶ 34.

²⁶⁷ See Public Notice, *FCC Requests Nominations by May 8, 2009 for Membership on the Technological Advisory Council*, 2009 FCC LEXIS 1522 (rel. Apr. 8, 2009).

²⁶⁸ *Id.*

²⁶⁹ *Innovation NOI* at ¶ 56.

availability. Confidentiality should protect proprietary materials submitted to the FCC as well as the application and grant of authorization, where requested, until carriers or manufacturers make the devices publically available. This will facilitate the authorization process by promoting the flow of information between the Commission and manufacturers.

The Commission should also work with the U.S. Customs Service to develop a coordination process that will allow for the efficient importation of wireless devices manufactured abroad. For instance, importation could be expedited if a process is established by which the Customs Service can confirm the status of devices that have been certified, but which certification has not been publicly released.

2. Special Temporary Authority

The Commission also seeks guidance as to “what can be done to affirmatively support experimentation in wireless technology and services.”²⁷⁰ In this regard, CTIA agrees with the Commission that grants of Special Temporary Authority (“STA”) can serve to promote wireless innovation.²⁷¹ These types of licenses permit the use of spectrum for a specified period and scope and allow entities to experiment, test and evaluate new technologies in a controlled interference environment.²⁷² As such, STAs have been successful in facilitating the development of new wireless devices and technologies and should be recognized as one of the Commission’s primary tools for promoting innovation and investment.

Experimentation could also be supported by adjustments to the Commission’s import limits for devices being imported for testing and evaluation under 47 C.F.R. § 1.1204(a)(3). The current limits are 2,000 or fewer units designed solely for operation within a licensed service and 200 or

²⁷⁰ *Id.* at ¶ 65.

²⁷¹ *Id.* at ¶ 30.

²⁷² *See, e.g.*, 47 C.F.R. § 1.931.

fewer units for all other devices. The market reality is that domestic manufacturers are increasingly relying on foreign manufacturers to provide them with prototypes for testing and market evaluations. Moreover, the devices themselves are becoming more complex over time. This necessitates the use of multiple design and technical research teams working in tandem to evaluate a wide range of regulatory and commercial issues. The current limits are simply insufficient to allow manufactures to import enough devices to accomplish these tasks quickly and efficiently. A substantial increase in the limits is warranted.

D. The Commission Should Generally Leave Network Management To The Network Operators

The *Innovation NOI* asks whether the open platform obligations placed on 700 MHz C Block licensees or other network management obligations should be applied more broadly.²⁷³ In thinking about innovation in the network, it should be noted that Chairman Genachowski recently announced his intention to initiate a rulemaking that would consider imposing the Broadband Policy Statement, and possibly requiring additional principles, on wireless broadband services.²⁷⁴ As this proceeding unfolds, it is critical that the Commission recognize that wireless broadband networks are fundamentally different than other broadband networks for many reasons. The Commission should not attempt to shoehorn the modern, innovative wireless broadband industry into a definition crafted and applied for use on wireline technologies. CTIA urges the Commission to affirmatively recognize the different circumstances that militate against attempting to apply wireline rules to a wireless world.

²⁷³ *Innovation NOI* at ¶ 59.

²⁷⁴ See Julius Genachowski, Chairman, Federal Communications Commission, *Preserving a Free and Open Internet: A Platform for Innovation, Opportunity, and Prosperity* (Sept. 21, 2009), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293568A1.pdf (last visited Sept. 24, 2009).

As touched on herein, the underlying infrastructure of spectrum-based networks, as well as the tight and coordinated integration of customer equipment with the network, make wireless significantly different from wired broadband networks:

- The capacity of a wireless cell site is shared between all users in that cell. The wireless user must share the available bandwidth with other users in their vicinity.²⁷⁵
- The capacity of a cell is shared between all services running over the network. Wireless voice and data use share the finite capacity of the cell.
- Wireless providers cannot “build their way out” of spectrum constraints. Unlike wired services that can add capacity through greater buildout, constraints on expansion of network capacity are a reality for spectrum-based services. In the absence of significant additional spectrum allocations, wireless networks must be managed to maximize the consumer benefit from the network.

Affirmative recognition of the differences between wired and wireless networks, as CTIA and several other parties have advocated in GN Docket No. 09-51, necessitates recognition that the Commission’s Broadband Policy Statement is ill-suited for application to wireless networks.²⁷⁶

Indeed, as one commenter just recently noted:

Those that believe in “one Internet” aren’t paying attention to the fact that use cases for wireless broadband users hitting their 5GB-per-month limit over their cellular laptop card and home desktop PC users coming up against their cable modem’s newly imposed 250GB-per-month cap are not the same, that ever-richer media (including all manner of video) cannot continually be pumped onto mobile networks without consequence.²⁷⁷

Before it imposes regulations on the wireless carriers, it is critical that the Commission fully understand the impact such rules have over the wireless network and infrastructure.

²⁷⁵ See Opposition of CTIA, RM-11361 (filed Apr. 30, 2007), Attachment C (Jackson Paper) at 3.1.1; see also Marius Schwartz and Federico Mini, *Hanging up on Carterfone: The Economic Case Against Access Regulation in Mobile Wireless* at 19 (May 2, 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=984240 (last visited Sept. 24, 2009).

²⁷⁶ See, e.g., 2009 Comments of CTIA at 27-30; see also Comments of Mobile Future, GN Docket No. 09-51 at 14-15 (filed June 8, 2009); see also Comments of Motorola, Inc., GN Docket No. 09-51 at 21 (filed June 8, 2009); see also Comments of Verizon and Verizon Wireless, GN Docket No. 09-51, at 103-107 (filed June 8, 2009).

²⁷⁷ See Jeffrey Belk, *Bring Back the Radio Wars* (Sept. 27, 2009), available at <http://gigaom.com/2009/09/27/bring-back-the-radio-wars/#more-70528> (last visited Sept. 28, 2009).

Wireless carriers' network management tools currently strike a content-neutral balance between the need to manage high-bandwidth applications when spectrum-constrained networks become congested, with access to the capacity and capabilities that have brought innovation to wireless consumers. However, as data speeds and device offerings increase, and as air cards, netbooks and mobile hotspots become increasingly popular, consumption and bandwidth use will continue to grow at a staggering pace. While U.S. wireless providers are among the most efficient worldwide, wise management of the shared network is a necessity. Today, wireless carriers utilize a variety of network management tools adding intelligent features to the network and to the wireless devices themselves. This has enabled the wireless industry to push the envelope of innovation and to better serve customers.

The Commission also should be mindful of how network neutrality rules would be applied to business relationships in the wireless ecosystem, which often are different than those typically found in other sectors. For example, it is an open question regarding how a non-discrimination regulation would impact a single-purpose device like the Amazon Kindle e-reader. Similarly, how would net neutrality regulations affect efforts by Apple, Google's Android, BlackBerry, Firefly and others to differentiate the products and services they develop for consumers?²⁷⁸ The Commission must be careful that its effort to "open" the network does not in fact result in stifling innovation and investment.

Moreover, Commission regulations cannot readily adapt to the rapid changes in technology and the implementation of the new management tools attendant to such changes. Thus, onerous and rigid network management obligations on wireless operators would hamper wireless innovation by

²⁷⁸ See also Brad Stone, *Best Buy and Verizon Jump Into E-Reader Fray* (Sept. 22, 2009), available at http://www.nytimes.com/2009/09/23/technology/internet/23ebooks.html?_r=3&src=tptw (last visited Sept. 24, 2009) (announcing Verizon Wireless providing 3G EV-DO network support for an e-reader).

denying operators the flexibility they need to manage their networks in an environment of finite spectrum resources and close integration between network and device.

E. The Commission Should Maintain Regulatory Flexibility With Regard To Wireless Providers' Business Practices

As touched on in Section I.B.1, wireless providers also have been innovators with regard to their business practices and customer relations. For instance, over six years ago, CTIA, together with a number of wireless carriers, voluntarily established a “Consumer Code” to facilitate the provision of accurate information to consumers by wireless service providers.²⁷⁹ Also, in 2003, the industry voluntarily adopted a nationwide recycling campaign called “Wireless . . . The New Recyclable.”²⁸⁰ On April 28, 2009, CTIA announced its commitment to support a common format for wireless phone chargers to help reduce energy consumption and make device charging easier.²⁸¹ The wireless industry also has developed industry-wide standards for content guidelines and best practices for location-based services, and mobile financial services.²⁸²

In short, the mobile wireless industry has been a leader in developing industry-wide standards for challenging issues, and the Commission should exercise care to ensure that it does not hamper these efforts by adopting rigid rules prescribing wireless providers' business conduct. As Commissioner Baker recently stated, the Commission should take a “leadership role in encouraging and coordinating industry best practices” rather than establishing “stagnant, prescriptive rules of

²⁷⁹ See *supra* Section I.B.1.

²⁸⁰ See Wireless The New Recyclable, *Welcome*, available at <http://www.recyclewirelessphones.com> (last visited Sept. 29, 2009).

²⁸¹ See *supra* Section I.B.1.

²⁸² See *id.*

business conduct.”²⁸³ The industry has stepped in to address challenging issues by adopting best practices, and the Commission should continue to support such efforts.²⁸⁴

CONCLUSION

For the foregoing reasons, CTIA encourages the Commission to account for the virtuous cycle of innovation and investment that regularly occurs in the mobile wireless ecosystem as it considers taking further action on the *Innovation NOI*.

Respectfully submitted,

/s/ Brian M. Josef
Brian M. Josef
Director, Regulatory Affairs

Michael F. Altschul
Senior Vice President and General Counsel

Christopher Guttman-McCabe
Vice President, Regulatory Affairs

Robert F. Roche, Ph.D.
Vice President, Research

CTIA-THE WIRELESS ASSOCIATION[®]
1400 16th Street, NW, Suite 600
Washington, DC 200036
(202) 785-0081

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²⁸³ Meredith A. Baker, Commissioner, Federal Communications Commission, *Incentives Matter: Decision Making at the FCC* (Sept. 10, 2009), at 2, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293380A1.pdf (last visited Sept. 30, 2009).

²⁸⁴ See *supra* Section I.B.1.